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ABSTRACT

The purpose of this Guide is to help those receiving data and data products from the National Oceanographic Data Center (NODC) to make better use of the material obtained. In addition, it should help data requesters to intelligently formulate inquiries based on a knowledge of the capabilities (and limitations) of the data base. Chapter I of the Guide is the introduction; Chapter II contains the general procedure for handling data requests; Chapter III describes the physical-chemical data processing; Chapter IV the BT data processing systems--digital; Chapter V the geology core, grab, and dredge information system; Chapter VI the biological information systems; and Chapter VII discusses future plans for NODC. A short glossary of terms is also included. (Author/NH)

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NATIONAL OCEANOGRAPHIC DATA CENTER

GENERAL SERIES

USER'S GUIDE
FOR
NODC'S DATA PROCESSING SYSTEMS

Compiled by
SONJA SCHUYLER

PUBLICATION G-15

1969

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GLOSSARY

BINARY CODED DECIMAL (BCD)	Pertaining to a decimal notation in which the individual decimal digits are each represented by a group of binary digits; e.g., in the 8-4-2-1 binary coded decimal notation the number 23 is represented as 0010 0011, whereas in binary notation 23 is represented as 10111.
BIT (Binary Digit)	A character used to represent one of the two digits in the number system with a base of 2.
BLOCKING FACTOR	Combining two or more records into one block.
CARD IMAGE	A 1:1 representation of the contents of a punched card.
CHARACTER	One symbol of a set of elementary symbols (such as those corresponding to keys of a typewriter) selected to represent data which a computer may read, store, or write.
CRUISE FILE	Data in computer-compatible form sequenced by NODC Reference Number.
DENSITY	The number of useful storage elements per unit of dimension, e.g., the number of bits per inch stored on a magnetic tape or drum track.
DIGIT	A character used to represent one of the nonnegative integers that is smaller than the base, e.g., in base 10 (decimal notation), one of the characters 0 to 9.
GEOSORT FILE	Data in computer-compatible form arranged by geographic area.
INPUT	(1) The data to be processed. (2) The process of transferring data from an external storage to an internal storage.
LISTING	See PRINTOUT

GLOSSARY (CON.)

LOGICAL RECORD	A record whose scope, direction, or length is governed by the specific nature of the information or data which it contains instead of by some feature or limitation of the storage device that holds it. Such records differ in size from the physical records in which they are contained. Physical records might be limited to 400-character physical record size, but many logical records might require fewer or more than the limit.
OUTPUT	(1) Data that have been processed. (2) The process of transferring data from an internal storage to an external storage.
PARITY BIT	A binary digit appended to an array of bits to make the sum of all the bits either always odd or always even.
PHYSICAL RECORD	See LOGICAL RECORD.
PRINTOUT	The printing of coded characters on a device that expresses coded characters as hard copy.
RECORD	A collection of related items treated as a unit.
ZONE PUNCH	A punch in the O, X, or Y rows on a punched card.

I. INTRODUCTION

The purpose of this Guide is to help those receiving data and data products from the National Oceanographic Data Center (NODC) to make better use of the material obtained. In addition, it should help data requesters to intelligently formulate inquiries based on a knowledge of the capabilities (and limitations!) of the data base.

In the evolution of NODC, modifications have occurred in the physical characteristics of the data base and in the methods of data storage, retrieval, and display. Many of these changes came about as a direct result of users' requirements; for example, general retrieval programs have been modified to reflect these requirements to the fullest extent possible. Of course, special programs still have to be designed to meet specific problems. However, as our knowledge of requirements grows, our systems and services will expand. As a result of previous experience, the NODC data systems are being redesigned; some of this work is described in the last section.

This Guide should answer many of your questions concerning present capabilities. As new capabilities are developed, supplements to this publication will incorporate the changes as rapidly as possible; however, these supplements are not intended to serve as substitutes for personal discussions and exchange of ideas. The description of computer programs is necessarily brief.

If you are interested in further information, please contact the:

National Oceanographic Data Center
Washington, D. C. 20390
Attention: Data Services Branch

Phone: Area Code 202, OX3-2811 or OX3-4127

Cable: NODCUSA

II. GENERAL PROCEDURES FOR HANDLING DATA REQUESTS

NODC wants each requester to receive data and information tai' ored to meet his individual need ana completed within his required time limit.

The Center answers without reimbursement any general questions pertaining to marine sciences, data holdings, instrument output, and reference sources, as well as requests for small amounts of data. Usually, requests requiring less than 1 man-day's work or its equivalent in cost are answered without charge. Requests requiring additional work are handled on a reimbursable basis. In addition, as an interagency organization, the Center acts as a focal point for handling requests for marine data and information available from other Federal agencies.

Exchange agreements exist between NODC and most other national oceanographic data centers and service bureaus. Under these agreements, data from the national data base are provided in exchange for information of like kind. Therefore, it is suggested that U. S. requesters requiring data from foreign sources utilize the Data Center as a channel of communication for obtaining such data.

Each request should contain: (1) definition of the data desired, (2) limits of the geographic areas, and (3) any other pertinent information to assist in understanding the request. The geographic area should be described by Marsden squares or by latitude and longitude.

As necessary, the requester will be provided with a cost estimate and approximate delivery date. This estimate is based on conditions known at the time of the request; it is subject to revision in the event of unforeseen developments. The requested work will begin on receipt of a check or money order made payable to the National Oceanographic Data Center (or, for Federal activities, upon receipt of the proper form authorizing transfer of funds). For those organizations with recurring requests and/or requirements for rapid retrieval, arrangements can be made to maintain a fund or working account against which costs may be charged.

The charges made for providing data are determined by the cost to NODC; they depend on such factors as the number of observations involved, special analyses required, need to write computer programs, computer or EAM rentals, materials needed, etc.

Because the Data Center exists to provide data and information services, all requests receive immediate attention and the highest priority possible in scheduling. Since many requests may be in work at the same time, and since special handling is often required, delays still may be encountered. Requesters are asked to specify when time requirements are critical.

Requesters may ask for machine printouts, punched cards, or magnetic tapes. Data in other forms are available as described. Those receiving magnetic tapes may specify their tape requirements on the form shown in Appendix 1.

III. PHYSICAL-CHEMICAL DATA PROCESSING SYSTEM

General

The physical-chemical data processing system (often referred to as the station data system) is designed to handle ocean station data from Nansen casts and electronically observed serial data which have been manually digitized. These data can be provided on machine-generated printouts, punched cards, and magnetic tapes. In addition, a variety of displays may be generated for special applications.

Printout Format

Machine printouts are available in the form of archive listings on regular machine tabulation paper, with page breaks occurring at random and without column headings, or as publication listings on heavy white paper, one station per page with printed column headings. The publication listings are suitable for photo-offset printing. Column headings marked with an asterisk apply to electronically observed serial data only. Templates are provided with archive listings. Appendix 2 is a sample publication listing, and Appendix 3 gives the explanation for the template symbols.

Punched Card Format

A listing for an oceanographic station is produced from Master, Observed Depth, and Standard Depth Cards. The Master Card (card type 1) contains reference information concerning the cruise, station, and associated surface meteorological data. There are two types of Observed Depth Cards: (1) Observed Depth Card (card type 3), which contains data recorded at the observed depth; and (2) Literature Observed Depth Card (card type 4), which is used when only the originator's interpolated values are available. This second entry is designated LIT on the printout and is treated as an observed value during computer processing. There are also two types of Standard Depth Cards: (1) NODC Standard Depth Card (card type 6), which is produced by computer interpolation; and (2) Originator's Standard Depth Card, which contains the originator's hand-interpolated values.

Tape Format

The station data tape archive files are on 7-channel magnetic tape, 556 characters per inch, in BCD code, even parity, with 120-character logical records blocked at 10 logical records per physical record. Data from punched cards are entered on tape by use of a zone-edit routine, which codes the zone punches from the punched card as follows: no zone punch - blank; "x" overpunch - 1; "y" overpunch - 2; zero-zone punch (not numeral 0) - 3. Characters 101 - 102 are sorting keys, and characters 103 - 120 are the coded zone punches described above. Appendix 4 shows the standard NODC tape layout for oceanographic station data.

Program Library

The following NODC programs are available:

1. Station Data Compute (AUTOCODER/IBM 7074)--Interpolates temperature and salinity and oxygen values for the standard oceanographic depths from the observed depths. It computes sigma-t and Wilson's sound velocity for all depths, specific volume anomaly and dynamic depth anomaly at standard depths only. The interpolated values of temperature and salinity are used to compute the anomalies and sound velocities for the standard depths. Interpolation is performed by use of a 3-point Lagrange method unless the interpolated value for the standard does not fall between the upper and lower observed values. In this case, a linear interpolation is performed. The data are in cruise-station sequence in the NODC format. Output is in the form of punched cards and listings.

2. Station Data Interpolation of Specific Volume and Dynamic Depth Anomalies (FORTRAN/IBM 7074)--Computes specific volume anomalies and dynamic depth anomalies for observed depths. A 3-point Lagrange or linear interpolation, as outlined under 1. Station Data Compute, is then performed to compute values at standard depths; the difference is computed between the values of this program and those of the program described in paragraph 1. Output is in the form of listings only.

3. Parameter Inventory (AUTOCODER/IBM 7074)--Is derived from the file of physical-chemical stations sorted by geographical area (also known as the "geosort" or "geo-file") and includes station identification numbers, depth to bottom, maximum sample depth, percentage of levels sampled for nutrient chemistry, presence or absence of water color, and transparency codes. Maximum depth of valid observations suitable for computation of density and sound velocity (effective depth), minimum depth, and a vertical indicator which is the arithmetic average of vertical sample spacing in tens of meters are also listed. The output is a magnetic tape, and an associated printout program is available. The data are arranged by Marsden square, 1° square, and month, but may be resorted as necessary. The associated printout is written in SPS for use on the IBM 1401. Appendix 5 is a sample printout from this program.

4. Oceanographic Station Data Plotting (FORTRAN II/IBM 7074)--Yields temperature vs. depth, temperature vs. salinity, depth vs. sigma-t, temperature vs. O_2, temperature vs. PO_4, and salinity vs. depth plots (the last three are optional).

Using only the observed values sorted by station and depth, from the station data cruise file, the program generates graphs with temperature on the upper horizontal axis, sigma-t on the lower horizontal axis, density and oxygen on the left vertical axis, and salinity and phosphate on the right vertical axis. Output is plotter tape for use on the CalComp 670/564 Plotter. Appendix 6 is a sample of the output.

5. Station Data Inventory Plot by 5° Square--on Mercator Projection or Orthographic Projection for Popular Areas (FORTRAN II/IBM 7074)--Using the station data Master Card file, this program plots the number of ocean stations per 5° square or point locations of stations. Inventories may be made for month, season, or year at standard depths for the specified geographic area.

Output is a magnetic tape for use on the CalComp 670/564. Appendices 7 and 8 are samples of the output.

6. Composite Plot of Salinity and Depth vs. Sigma-t (FORTRAN II/IBM 7074)--Plots salinity vs. sigma-t and depth vs. sigma-t by quadrants of Marsden squares. Doubtful values are indicated by different symbols, but lines connect all data points. The geographically sorted station data file provides the input. Output is a magnetic tape for use on the CalComp 670/564 Plotter. Appendix 9 is a sample of the output.

7. Cruise Track--Mercator Projection (FORTRAN II/IBM 7074)--Generates a plot of a ship's cruise track from the station data Master Cards sorted by cruise and time for a maximum of 600 stations. The program determines the maximum and minimum latitudes, rounds them to the nearest 5°, and determines the scale factor which will make the longer side equal to 20 inches. A digitized world layout may be used as a background. The output is a magnetic tape for use with the CalComp 670/564 Plotter. Appendix 10 is a sample of the output.

8. Sound Velocity Depth Profiles (FORTRAN II/IBM 7074)--Plots curves of depths vs. sound velocities for selected months in a 1° square area for which there are at least "a" stations exceeding "b" meters, or for selected seasons having "c" stations exceeding "d" meters ("a", "b", "c", and "d" are elective). Input is geographically sorted station data. Output is a magnetic tape for use on the CalComp 670/564 Plotter. Appendix 11 is a sample of the output.

9. Sound Velocity and Temperature Summary (FORTRAN II/IBM 7074)-- Uses criteria described above and summarizes sound velocity and temperature as shown in Appendix 12. Input, programming, and operation are as described above. Output is an IBM 1401 listing.

10. Ocean Station / Bathythermograph Data Selection--Part I (AUTOCODER/IBM 7074)--Selects data from geographically sorted files, by any combination of Marsden square, 1° square, quadrant, month, year, maximum sample depth, weather ship, and observed data only. This program may be used for either ocean station data or bathythermograph data. Output may be a printout, punched cards, or magnetic tapes of selected data.

11. Ocean Station Selection--Part II (AUTOCODER / IBM 7074)--Takes selected output from Part I and selects, on the basis of data presence, any combination of parameters, effective depth, and other items mentioned under 3. Parameter Inventory. In addition, it may select only Master Card data, or stations may be selected where sigma-t is equal to or greater than a given sigma-t value.

12. Vertical Array Summary Program (AUTOCODER / IBM 7074)--Computes maximum, minimum, average, standard deviation, and number of observations at all standard levels for any combination of six parameters (temperature, salinity, sigma-t, oxygen, sound velocity, and dynamic depth). These summaries may be monthly or annual averages. The area may include up to thirty 1° squares in each Marsden square. Input is the geographically sorted station data file. Output may be magnetic tape printout or a special condensed tape of Marsden square, 1° square, month, depth code, temperature, salinity, sigma-t,

and oxygen at each standard level. This special tape is used as an input to a histogram plot program to plot derived summary values. Appendices 13 and 14 describe the printout and plotter output.

13. Horizontal Summary (AUTOCODER/IBM 7074)--Computes the average value and number of observations for a maximum of seven parameters (temperature, salinity, sigma-t, oxygen, sound velocity, specific volume anomaly, and dynamic depth anomaly) by 1° square and month, or combination of months, for a maximum of 30 standard depths. Parameters, months, and standard depths to be summarized may be varied. Input is the geographically sorted station data file. Output is a magnetic tape, which is used as input to a plotter program that plots the average value and number of observations for each of the parameters, time periods, and depth levels selected. Appendix 15 is a sample of the output.

Archive Arrangements

1. Punched Cards - Retained by NODC Reference Numbers with stations arranged according to Consecutive Station Number within each cruise.

2. Station Data "Geosort" - A magnetic tape file, on which the stations are arranged in the following sequence: Marsden square, 1° square, month, country, NODC Reference Number, Consecutive Station Number, Master Card indicator, depth, Standard Card indicator.

3. Clean Tape File I - An edited version of the station data "Geosort" (see 2 above). The edit consists of eliminating stations which do not meet certain quality control standards. Stations that contain doubtful depth, temperature, or salinity values or lack temperature or salinity values are dropped. Doubtful oxygen values are removed, but the stations are retained if the other observations are acceptable. Sample spacing requirements are at least four usable values from 0-300 m. and at least five usable values from 300-1200 m. If maximum sample depth is less than 1200 m., at least two observations are required between 300 m. and 600 m., three observations between 300 m. and 900 m., and four observations between 300 m. and 1199 m. If the sample spacings between 0 m. and 300 m. meet the spacing requirements, this part of the station is retained regardless of the spacing of lower samples.

4. Clean Tape File II - Contains the same stations as Clean Tape File I, but only observed data (OBS) are recorded.

IV. BT DATA PROCESSING SYSTEM—DIGITAL

General

Digital bathythermograph (BT) data are processed in two stages. The first is transcription of the originator's analog print data into NODC format with temperature readings at equal intervals. No unit conversions are made during this stage, and the resultant data are referred to as input data. The second stage is conversion of the data to metric units of depth and degrees centigrade and merging of these data with the geographically sorted data base. These data are referred to as output data.

Input Printout Format

This printout is arranged by NODC Reference Number and Consecutive Print Number. These printouts are not retained, but may be generated from the cruise-oriented punched card file. Normally these input data are not used in answering requests since the units vary, but they are available to those requiring data in cruise sequence.

Output Printout Format

This printout is generated after the computer has converted all units and has sorted the data geographically on the basis of Marsden square and 1° square. Temperatures are read at 5-meter intervals. Appendix 16 shows a sample printout and explanation sheet.

Input Punched Card Format

For each BT print there are several associated punched cards--one Master, one Reference, and as many Detail Cards as necessary. The Master Card (card type 1) contains the NODC Reference Identity Number, Consecutive Print Number, and general environmental data. The Reference Card (card type 2) contains the originator's cruise, station, and ship information. The readings are made at 10-foot, 5-meter, or 2-fathom intervals in degrees Fahrenheit or centigrade, depending on calibration of the BT grid. One detail card is prepared for each reading.

Output Tape Format

The output tape for BT data is 7-channel magnetic tape, 556 characters per inch, with 120 characters per logical record, blocked at ten logical records per physical record. The 80-column punched card data are transcribed to tape by use of the same zone-edit routine used for physical-chemical data. The first 80 characters on the tape represent the non-zone punches on the punched card, characters 81-111 handle the zone punches on the punched card, coded in the same manner as for the physical-chemical data. Characters 112-113 contain the month, 114-115 the 1° square, and 116-118 the Marsden square. Characters 119-120 are blank. Appendix 17 shows the tape format.

Bathythermograph Program Library

1. BT Geographical Inventory (AUTOCODER/IBM 7074)--Generates an inventory of the number of BT's available by Marsden square, 1° square, year, and month. Input is the BT geosorted file. Output is a magnetic tape and printout. Appendix 18 is a sample printout from this program.

In addition, an inventory is prepared from punched cards on EAM equipment. This inventory is sequenced by ship name, NODC Reference Number, or date. Other sorting arrangements can be made if the need arises. Appendix 19 is an example of this inventory.

2. Bathythermogram Composite Plot (FORTRAN II/IBM 7074)--Generates temperature vs. depth traces from digitized data. Plots may be generated for a particular Marsden square, 1° or 5° square, and month or group of months (season), with a maximum of 44 traces per page. Input to this program is the BT geosorted file. Plotter output is on the CalComp 670/564. Appendix 20 is a sample plot.

3. Ocean Station/Bathythermograph Data Selection (AUTOCODER/IBM 7074)--Selects BT data from the BT geosort by any combination of month, year, Marsden square, 1° square, quadrant, or maximum depth according to the directions on the control card used with the program. With this program, it is also possible to select "on station" observations taken by weather ships. Output is a magnetic tape or printout which may be obtained by use of a program written in SPS for operation on the IBM 1401.

4. Gradient Summary for Thermocline Depth (FORTRAN II/IBM 7074)--Computes the average temperature gradient at 20-meter depth intervals within a Marsden square and summarizes this information by month. The printout lists the average temperature gradient and the number of observations used to compute this average. The purpose of the program is evaluation of the gradient criteria to be used in establishing threshold values for layer depth and thermocline determinations. Output is a printout which is obtained by use of an SPS program for operation on the IBM 1401. Appendix 21 is a sample printout.

5. Extraction of Thermocline and Mixed Layer Depths (FORTRAN II/IBM 7074)--Used in conjunction with the program for Gradient Summary for Thermocline Depth to compute the mixed layer depth and depth to top of the thermocline. The output from the Gradient Summary Program is used to select gradient criteria for this program. Output is a printout which is obtained by use of an SPS program for operation on the IBM 1401. Input may be from the BT geosorted file or from selected references. The output from this program lists depth of mixed layer and thermocline for single BT observations and also lists mean depths by month for each 1° square. Appendix 22 is a sample of the printout.

Archive Arrangements

1. Punched Cards - The input data are archived on punched cards which are arranged by NODC Reference Number; the cards are sequenced by consecutive observation.

2. BT Geosort - This magnetic tape file contains BT observations sorted in the following sequence: Marsden square, 1° square, month, Reference Number, Consecutive Number, and Card Number.

3. Analog BT Prints - The original analog temperature traces and associated information are retained in a geographic file for use by those wishing to view individual temperature traces. The prints may also provide supplementary information which can be obtained on request. Some prints may be reproduced by ozalid or xerox. Since processing methods and data codes have changed during the period of record, the temperature traces may or may not be adjusted, and the codes may or may not be equivalent. Units of temperature and depth may also vary. About 50% of the usable analog prints are available in the digitized geosort (see paragraph 2 above).

V. GEOLOGY CORE, GRAB, AND DREDGE INFORMATION SYSTEM

General

The geological system at NODC is an information storage and retrieval system designed to provide information about marine geological sampling operations. Because of the great variety in sampling and analyzing methods used in marine geology, this system has not attempted to process or standardize the actual data. Instead, it provides information on the time, place, and type of sampling, description and location of the sample, and sample data.

Printout Format

Two printout formats are available. The first type is produced from punched cards, and the entries are sequenced by NODC Reference and Consecutive Numbers, while the other format is generated from a tape file. From tape, one has the option of listing only the information from the Master Card or the information from all three card types. Appendix 23 shows a sample printout from tape and an explanation of column headings.

Punched Card Format

Three card types are used for each entry. The first is the Master Card. This card contains the basic information which identifies the sample by date, time, place, and institution which took the sample. The second card type is the Sampling Information Card which gives information on the sampling device, sampling technique, condition of sample and sampling device, and remarks. The Sample Description Card, card type 3, describes the color, odor, and contents of the sample. NODC Publication M-5, Instructions for Coding and Keypunching the Geological Sample Information Form for Core, Grab, and Dredge Samples, describes the punched card and provides coding instructions (see Appendix 24).

Tape Format

Geological sample inventory data are geographically sorted on magnetic tape by Marsden square and 1° square. The data are on 7-channel magnetic tape, 556 characters per inch, in BCD code, 80-character logical records, blocked at 10 logical records per physical record. Appendix 25 describes the tape layout.

Program Library

1. Geological Data Printout (FORTRAN II/IBM 7074 and 1401)--Selects and prints portions of the NODC Geological Sample Information File. The selection of data may be made by Marsden square, 1° square, a series of Marsden squares, or a series of 1° squares, depending on coding of the control card. Input is the magnetic tape geosorted file. Output is a magnetic tape and/or a printout.

2. Inventory (FORTRAN II/IBM 7074)--Generates charts which summarize the number of core samples and grab and dredge samples combined for each 1^{o} square. Input is the

magnetic tape geosorted file. Plotter output is on the CalComp 670/564. Appendix 26 is a sample plot.

3. Inventory Plot (FORTRAN II/IBM 7074)--Plots the sample locations on a Mercator chart; one chart is generated for core samples and one for grab and dredge samples. Input is the magnetic tape geosorted file. Plotter output is on the CalComp 670/564. Appendix 27 is a sample plot.

Archive Arrangements

1. Punched Card File - The punched cards are arranged by NODC Reference Number and by Consecutive Station Number within each Reference Number.

2. Geological Sample Inventory File - The data in this inventory are geographically sorted by Marsden square and 1° square and stored on magnetic tape.

VI. BIOLOGICAL INFORMATION SYSTEMS

Biological information at NODC is handled by two systems: an Information Storage and Retrieval System, which processes reprints from scientific journals; and a Data System, which processes digital data.

The Information Storage and Retrieval System uses coordinate indexing with three types of categories: geographical area, subject, and taxonomy. Scientific reprints are read by biological oceanographers and indexed by the appropriate terms from each of the above categories. The geographical area is described by Marsden square and quadrant, and the taxonomy by genus name and the higher taxonomic terms which have been designated for each phylum. Subject descriptors are selected from the Thesaurus of Biological Terms, which has been developed at NODC.

Document retrieval can be accomplished by use of a single descriptive term or by coordination of terms from different categories. For example, a general request for biological information concerning the Chesapeake Bay would be satisfied by retrieval of all documents listed for MS 116-4, the Marsden square and quadrant for that area. A specific request for information on the feeding habits of the American oyster in the Chesapeake Bay would be satisfied by coordination of the terms--MS 116-4, Feeding Habits, and Crassostrea--and retrieval of only those documents common to all three terms.

Output from this system may be a bibliography, an annotated bibliography, or the documents themselves. Present copyright laws prohibit the duplication and distribution of most source documents; however, they are available for use at NODC. At the present time this system is operated manually. Both indexing work sheets and the original documents are available on microfilm as well as in hard copy.

The Biological Data System involves processing of four types of digital biological data: (1) zooplankton, (2) phytoplankton, (3) phytoplankton pigment, and (4) primary productivity. Published data have been reduced to standard units and coded into the NODC punched card format. Codes have been developed to indicate sampling and analysis techniques. The phytoplankton data deck consists of two card types per station; the other three decks use three card types per station. The printout formats are shown in Appendix 28. The Manual for Coding and Keypunching Biological Data, NODC Publication M-4 (Provisional), contains an explanation of the codes used in the printouts.

At the present time 12,000 stations are available in punched card format. No further additions will be made to this data system, as a more flexible data handling system is being developed. However, these punched card data records will continue to be available.

VII. COMING ATTRACTIONS

In the very near future NODC will begin to process types of data other than those described in this publication. When the output cycle of these systems becomes operational, supplements to this Guide will be issued. In order to handle the large volume and variety of data expected in the next few years, new hardware is required. The Data Center has acquired a high-speed CalComp Model 763 plotter and is in the process of acquiring an in-house computer. The new computer will require reformating and reprogramming of the present data base. This publication will therefore be undergoing extensive revision during the next few years. All new systems and programs are being designed to give us maximum flexibility in servicing requests.

Expendable BT (XBT) data are being digitized by the Fleet Numerical Weather Facility and will in the very near future be digitized by NODC. All these data will be archived at NODC. At first the data will be arranged by cruise on magnetic tape in a variable-length format, which will record the temperature in small incremental changes and the depth. As data accumulate, they will be sorted geographically and programs will be written for retrieval, display, and summarization. The quality of the XBT as a thermometer will be closely examined before any consideration is given to merging these records with those of the mechanical BT.

NODC is designing a General Data System (GDS) in order to acquire, process, and archive a variety of oceanographic data that do not yield large volumes in standardized format. The purpose of this system is to relieve the observer from the task of converting his data into several other fixed formats for inclusion in the National Marine Data Base.

GDS can be divided into three major components, provisionally entitled OCTOPUS, METAFORM, and OMNIBASE. OCTOPUS includes the formal accessioning and systematic definition of data and related information. This phase of the processing system will result in a Guide to Submission of Data, which will be available during the first half of 1969. METAFORM consists of computer processing of accessioned data into a standard but open-ended tape format (META-IN) and a reformating, retrieval, and inventory phase (META-OUT). META-IN will be initiated for a limited number of parameters in the near future. META-OUT is still in the early design stage. OMNIBASE will be the eventual storage system for heteorogeneous data processed by GDS and other systems. Detailed development is not planned until the hardware configuration of the NODC computer is known.

Data taken by salinity-temperature-depth instruments and digitally recorded at close intervals will also be acquired and stored by the Data Center. At this time a study is being made of the data reduction methods employed by various organizations with the goal of creating

guidelines for submission of these data to the NODC.

It is expected that automated retrieval of marine biological information on microfilm will soon be developed. In addition, a printout of the station data "geosort" on microfilm will soon be available. This copy will be generated by use of direct tape-to-microfilm techniques.

Since some of the above systems and many others are being developed, tested, and evaluated, it will be necessary to inform the user community of system completions in supplements to this Guide.

APPENDIX 1

Magnetic Tape Record Description Sheet

Magnetic Tape Record Description Sheet*

Magnetic Tape Description:

BLOCKING

☐ Card Image Format (80 BCD Char./Logical Record)

- ☐ 1 Logical Record/Physical Record
- ☐ 10 Logical Records (800 BCD Char.)/Physical Record
- ☐ Other _____

_____

☐ Zone-Edited Format (120 Char./Logical Record)

- ☐ 1 Logical Record/Physical Record
- ☐ 10 Logical Records (1200 Char.)/Physical Record
- ☐ Other _____

_____

☐ Other Format _____

_____

DENSITY

☐ 200 Char./In. ☐ 556 Char./In. ☐ 800 Char./In.

PARITY

☐ Even ☐ Odd

Printout Description:

Applicable Data Format

☐ Full Listing ☐ Sample Listing

Tape Dump Format (1 Logical Record/Line)

☐ Full Listing ☐ Sample Listing

* See Glossary for definition of terms

APPENDIX 2

Publication Listing of Oceanographic Station Data

REFERENCE		SHIP	LATITUDE	LONGITUDE	DRIFT	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SMPL'S	WAVE OBSERVATIONS				WEATHER CODE	CLOUD CODES			NODC STATION NUMBER
CTRY CODE	ID. NO.	CODE	° 1/10	° 1/10	INDEX	10°	1°	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT.	PER.	SEA		TYPE	AMT		
490009	KH		3235 N	13733 E		131	27	01	14	08	1939			4035	35				2		1	3		0084

WATER		WIND		BARO-METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		27	F02	23	100				

MESSENGER TIME GMT HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-10^7	$\Sigma\Delta D$ DYN. M. X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4-P µg-at/l	TOTAL-P µg-at/l	NO_2-N µg-at/l	NO_3-N µg-at/l	SiO_4-Si µg-at/l	pH	QUALITY CODE
		STD	0000	1710	3469	2527	0027085	0000	15135								
		LIT	0000	1710	3469	2527			15135								
		STD	0010	1709	3470	2528	0027021	0027	15136								
		LIT	0010	1709	3470	2528			15136								
		STD	0020	1710	3471	2529	0026988	0054	15138								
		LIT	0025	1711	3472	2529			15139								
		STD	0030	1710	3472	2529	0026962	0081	15140								
		STD	0050	1709	3472	2530	0027003	0135	15143								
		LIT	0050	1709	3472	2530			15143								
		STD	0075	1709	3472	2530	0027082	0203	15147								
		STD	0100	1709	3469	2527	0027380	0271	15151								
		LIT	0100	1709	3469	2527			15151								
		STD	0125	1524	3462	2564	0023900	0335	15097								
		STD	0150	1358	3456	2595	0021008	0391	15047								
		LIT	0150	1358	3456	2595			15047								
		STD	0200	1087	3445	2639	0016906	0486	14961								
		LIT	0200	1087	3445	2639			14961								
		STD	0250	0923	3435	2659	0015025	0566	14908								
		STD	0300	0794	3429	2675	0013591	0637	14867								
		LIT	0300	0794	3429	2675			14867								
		STD	0400	0643	3429	2696	0011635	0763	14824								
		LIT	0400	0643	3429	2696			14824								
		STD	0500	0529	3433	2713	0010004	0871	14795								
		LIT	0500	0529	3433	2713			14795								
		STD	0600	0444	3434	2724	0009018	0967	14777								
		LIT	0600	0444	3434	2724			14777								
		STD	0700	0395	3435	2730	0008473	1054	14773								
		STD	0800	0357	3438	2736	0007904	1136	14774								
		LIT	0800	0357	3438	2736			14774								
		STD	0900	0333	3444	2743	0007267	1212	14781								
		STD	1000	0311	3449	2749	0006722	1282	14789								
		LIT	1000	0311	3449	2749			14789								
		STD	1100	0293	3452	2753	0006365	1347	14799								
		STD	1200	0276	3454	2756	0006088	1409	14808								
		LIT	1200	0276	3454	2756			14808								
		STD	1300	0262	3456	2759	0005841	1469	14819								
		STD	1400	0249	3458	2762	0005601	1526	14831								
		STD	1500	0237	3460	2764	0005368	1581	14843								
		LIT	1500	0237	3460	2764			14843								
		STD	1750	0218	3461	2767	0005193	1713	14877								
		STD	2000	0201	3463	2770	0004950	1840	14912								
		LIT	2000	0201	3463	2770			14912								
		STD	2500	0175	3469	2776	0004376	2073	14987								
		LIT	2500	0175	3469	2776			14987								
		STD	3000	0159	3465	2774	0004609	2298	15066								
		LIT	3000	0159	3465	2774			15066								
		LIT	3500	0153	3474	2782			15152								

APPENDIX 3

Template Explanation for Oceanographic Station Data

1. GENERAL

Effective August 1963, oceanographic station data processed by NODC appeared in a new format approved by the NODC Advisory Board and are available in two basic types of machine listings:

a. Archive Listing -- This listings is printed on plain tabulation paper. Stations are listed in continuous order, with page breaks occurring at random within stations. For identification of fields, accompanying template should be used.

b. Publication Listing -- This listing is printed on heavy white paper suitable for photo-offset reproduction. Only one oceanographic station is printed per page.

The template bears information applicable to both Nansen-type data and electronically observed serial data. Column headings applicable to electronically observed data only are indicated with an asterisk (*).

A complete description of entries and codes appearing in the NODC station data listings can be found in NODC Publication M-2, Processing Physical and Chemical Data from Oceanographic Stations; Coding and Keypunching, Part I, Aug. 1964, and in Publication M-2, Coding and Keypunching Electronically Obtained Serial Data, Part IA, May 1966.

2. DESCRIPTION OF ENTRIES, UNITS, AND CODES ON NODC STATION LISTING TO BE USED WITH OVERLAY TEMPLATE

Top Part of Template

Entry	Description of Field
NODC REF. ID. NO.	NODC reference identify number.
COUNTRY CODE	Indicates nationality of the institute or agency conducting the survey or expedition.
CRUISE NUMBER	A reference number assigned by NODC for storage-retrieval purposes. NODC Publication C-1, Reference Sources of Oceanographic Station Data, gives complete bibliographic and other pertinent information for each cruise.

Top Part of Template (Continued)

Entry	Description of Field
SHIP CODE	Alphabetic representation of ship's name (or ICES numeric ship code).
LATITUDE	Degrees, minutes, and tenths of minutes, N or S.
LONGITUDE	Degrees, minutes, and tenths of minutes, E or W.
DRIFT INDICATOR	The letter D appears in this column if extensive drift occurred while on station.
MARSDEN SQUARE	
10°	Marsden square number according to the Marsden square system.
1°	The one-degree square number according to the Marsden square system.
STATION TIME (GMT)	Date and time given by the originator (GMT).
MONTH	Month (GMT).
DAY	Day (GMT).
HR. 1/10	GMT to nearest tenth of an hour.
YEAR	Year.
ORIGINATOR'S CRUISE NUMBER	Alphabetic or alpha-numeric designator as assigned by the originator. If the year of the cruise forms part of the cruise numbering system, the year digits are found in preceding field.
STATION NUMBER	Originator's station number or designator.

Top Part of Template (Continued)

Entry	Description of Field
DEPTH TO BOTTOM	Corrected or uncorrected sounding depth in meters.
MAX. DEPTH OF SAMPLES	Depth of deepest sample in hundreds of meters to nearest hundred-meter interval.
WAVE OBSERVATIONS	
DIR.	Direction from which the dominant waves are coming, in tens of degrees, according to WMO Code 0885.
HGT.	Height of dominant waves according to WMO Code 1555.
PER.	Period of dominant waves according to WMO Code 3155.
SEA AMT.	Sea amount (sea state) according to WMO Code 3700 (preceded by the letter A).
WEATHER CODE	If preceded by the letter X, weather according to WMO Code 4501. A numeric two-digit entry indicates weather according to WMO Code 4677.
*INSTR./CLOUD	This field is used either for recording instrument code when electronically obtained data are being reported, or for reporting cloud type and cloud amount when conventional Nansen cast data are being reported.
*INSTR.	A two character code representing instrument package of system.
TYPE	Cloud type according to WMO Code 0500.
AMT.	Cloud amount according to WMO Code 2700.
NODC STATION NUMBER	Assigned by NODC for data storage and retrieval purposes. The NODC Reference Identity and Station numbers combined, uniquely define each station in the NODC archives.

Middle Part of Template

Entry	Description of Field
*DT/ *SU/D	This indicator specifies that the reported data have been obtained electronically rather than by Nansen-type casts. U (up) and D (down) are cast indicators for electronically obtained serial data and specify that the data were taken while hoisting or lowering, respectively.
WATER COLOR	Water color according to Forel-Ule code.
TRANS. (m)	Water transparency in meters as determined by Secchi disc.
WIND	
DIR.	Direction from which wind is blowing, in tens of degrees, according to WMO Code 0877.
SPEED OR FORCE	If preceded by letter S, wind speed in knots; if preceded by letter F, wind force in Beaufort code.
BAROMETER (mbs)	Barometric pressure in millibars; tens, units, and tenths places only.
AIR TEMPERATURE °C	
DRY BULB	Dry bulb air temperature in degrees centigrade, to tenths.
WET BULB	Wet bulb air temperature in degrees centigrade, to tenths.
VIS. CODE	Visibility according to WMO Code 4300.
NUMBER OBS. LEVEL	The number of observed levels associated with the station.
SPECIAL OBSERVATIONS	Entries in this space vary with individual cruises or stations. Information concerning entries in this field can be requested from the NODC.

Bottom Part of Template
(Applies to third and all succeeding lines of listing)

Entry	Description of Field
*CAST TIME and DURATION or MESSENGER TIME or CAST NO.	
*CAST TIME AND DURATION (Hr. 1/10)	For electronically observed serial data only. Cast Time in GMT hours and tenths of hours is entered opposite the first depth, indicates the beginning time for observations for either up-cast or down-cast. Duration is the second entry in this field, shows the duration of the cast in hours and tenths of hours.
MESSENGER TIME	Time (GMT) of release of messenger, in hour and tenths of hour, at observed levels. If a multiple cast series extends past midnight, 24 hours are added to the cast time(s) of the next day.
CAST NO.	Number of cast (not printed when messenger time is given).
CARD TYPE	OBS -- Observed (sample) level
	STD -- Standard interpolated depth. Interpolation of temperature, salinity, and oxygen computed by a modified 3-point LaGrange formula.
	*STD -- Standard depth values interpolated by the originator or hand interpolated by NODC.
	LIT -- Interpolated standard depth values; original observed values not available.
	NOTE: When a valid observed level coincides with a standard depth level, both the OBS and STD lines will appear.

Bottom Part of Template (Continued)

Entry	Description of Field
DEPTH (m)	Depth of sample (or standard level) in whole meters, or meters to tenths. Postscript T indicates a depth at which both a protected and an unprotected thermometer were used. Subscript Q indicates that the value is marked doubtful by the originator. A value designated as potentially implausable by NODC is marked with a P. Postscript Z indicates a wireout depth which is uncorrected for wire angle.
T°C	Temperature in degrees centigrade to as many as three decimal spaces. (For P or Q notation see DEPTH field).
S°/∞	Salinity in parts per thousand (ppt) to as many as three decimal spaces. (For Q and P notation see DEPTH field).
SIGMA-T	Sea water density as σt to hundredths [(g/l)-1000]. When depth, temperature, salinity, or any combination of these is doubtful, Q is suffixed.
SPECIFIC VOLUME ANOMALY - $x10^7$	Specific volume anomaly in (cm^3/gm) times 10^7. Appears at standard depths only.
$\Sigma\Delta D$ - Dyn. M.x 10^3	Dynamic depth anomaly in dynamic meters times 10^3. Appears at standard depths only.
COMPUTED SOUND VELOCITY (m/sec)	In meters per second to tenths according to Wilson's formula.
	NOTE: In the following designations, the character "l" stands for a small letter "L" denoting liter.
O_2 ml/l	Oxygen in ml/l to hundredths. Q indicates doubtful.
*AMBIENT LIGHT (lum/cm^2)	For electronically obtained serial data only; ambient (visible light in lumens/cm^2).

Bottom Part of Template (Continued)

Entry	Description of Field
(Replaces PO_4-P and a portion of total-P fields)	
PO_4-P (μg-at/l)	Inorganic phosphate in microgram-atoms per liter of P to hundredths.
TOTAL-P (μg-at/l)	Total phosphorus in microgram-atoms per liter of P to hundredths.
NO_2-N (μg-at/l)	Nitrites in microgram-atoms per liter of N to hundredths.
NO_3-N (μg-at/l)	Nitrates in microgram-atoms per liter of N to tenths.
*MEASURED SOUND VELOCITY (m/sec)	For electronically obtained serial data only; in meters per second, to tenths of meter.
SiO_3-Si (μg-at/l)	Silicates in microgram-atoms per liter of Si to whole numbers.
pH	pH to hundredths.
(Replaces a portion of SiO_3-Si and pH fields)	NOTE: Notation TRC in chemistry fields indicates report of trace or a value of less than 1 in the last column.

APPENDIX 4

Magnetic Tape Layout for Oceanographic Station Data

IBM 7074 TAPE RECORD LAYOUT

OCEANOGRAPHIC STATION DATA

RECORD-1 GENERAL TAPE LAYOUT (NODC FORMAT)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COUNTRY		SHIP		LATITUDE ° ′ 1/10					LONGITITUDE ° ′ 1/10						MARSDEN SQUARE			YEAR		DATE MONTH		DAY																											
FOR DESCRIPTION OF COLUMNS 25 - 71 SEE MASTER, OBSERVED STANDARD CARD LAYOUTS																																																	

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
																					NODC PROCESSING NUMBERS REF. ID. NO.						CONSEC. NO.		CD TYPE	08	14	15	31	32	34	36	37	42	46	48	51	52	53	59	62	63	71	72	80			

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	1	2	3	·	·	·	120	1	2	3	·	·	·	120	1	2	3	·	·	·	120	1	2	3	·	·	·	120	TM
b	b																																															
COLUMNS 103 — 118 CONTAIN BLANKS																				RECORD-2							RECORD-3															RECORD-N								TAPE MARK
																				ZONE EDIT NUMERIC CODES FOR POSITIONS 61 — 100: BLANK — EDITED COLUMN CONTAINED NO ZONE PUNCHES. 1 — EDITED COLUMN CONTAINED AN "11" (OR "X") ZONE 2 — EDITED COLUMN CONTAINED A "12" (OR "Y") ZONE 3 — EDITED COLUMN CONTAINED A ZONE (NOT DIGIT 0)																		

IBM 7074 TAPE RECORD LAYOUT

OCEANOGRAPHIC STATION DATA

MASTER CARD (NODC FORMAT)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
COUNTRY		SHIP		LATITUDE ° '				1/10	LONGITUDE ° '					1/10	MARSDEN SQUARE			DATE YEAR		MONTH		DAY	SHIP'S HOUR		1/10	SHIP'S CRUISE NO.			SHIP'S STATION NO.			DEPTH BOTTOM			MAX. SAMP. DEPTH			NO. OBS. LEVEL		WATER COLOR		TRANS.		WAVE DIR.		H/A	PW

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83			86					91		93		95	96	97	98	99	100
WIND FORCE DIR.		SPEED		BAR.		AIR TEMP DRY				WET		W W OR W		CLOUD TYPE	AMT.	VIS.		SPECIAL OBS.			NODC PROCESSING NOS. REF. ID. NO.			CONSEC. NO.					CARD TYPE	08	14	15			34					48		52		59	62	63	71	72	80

101	102																																															
b	b																																															

COLUMNS 103 — 118 CONTAIN BLANKS

IBM 7074 TAPE RECORD LAYOUT

OCEANOGRAPHIC STATION DATA

OBSERVED CARD (NODC FORMAT)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1—24 IDENTICAL TO MASTER CARD																								TIME			DEPTH					TEMP.				SALINITY					SIGMA-T					SOUND VELOCITY			

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85		87	88	89	90		92		94						
OXYGEN			PO_4-P			TOTAL-P			NO_2-N			NO_3-N			SiO_3-Si			pH			NODC PROCESSING NUMBERS REF. ID NO					CONSEC. NO.		CARD TYPE	08	14	15	31	32		36	37	42	46		51		53						

101	102																																																
1	1																																															

37

39

IBM 7074 TAPE RECORD LAYOUT

OCEANOGRAPHIC STATION DATA

STANDARD CARD (NODC FORMAT)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1–24 IDENTICAL TO MASTER CARD																								TIME			DEPTH					TEMP.					SALINITY						SIGMA-T						SOUND VELOCITY		

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83			87			90		92			95		97			
OXYGEN			SPECIFIC VOLUME ANOMALY						DYNAMIC DEPTH ANOMALY												NODC PROCESSING NUMBERS REF. ID NO							CONSEC. NO.		CD TYPE	08	14	15			36			46		51			59		63			

101	102																																																
1	b																																																

APPENDIX 5

Parameter Inventory Listing

OCEANOGRAPHIC STATION DATA PARAMETER INVENTORY

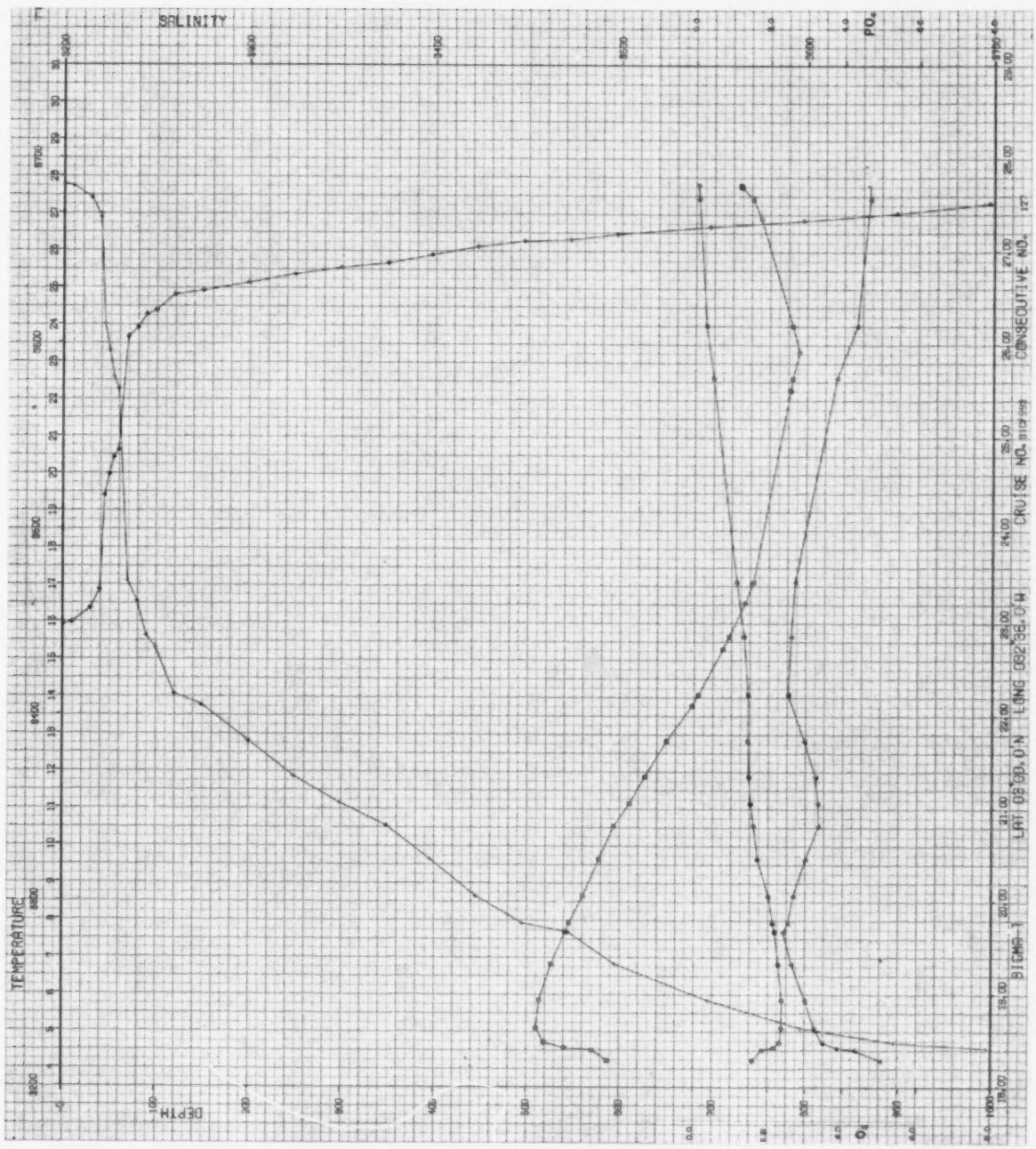
LOCATION			DATE			REFERENCE NO.			POSITION				DEPTH SPACING					PARAMETERS SAMPLED									
MSQ	5 SQ	1 SQ	MO	DA	YR	NODC CRUISE	CS	SHIP CD	LAT DEG	LAT MIN	LONG DEG	LONG MIN	SON DPH	MAX SAM	EFF DPH	MIN DPH	NO DPH	VERT IND	S	O	P T R	N 2	N 3	S I	P H	C R	T R
																		00001	STATIONS IN			DEG		SQ		65	
012	3	74	11	03	1955	31 0806	0013	HS	07	37. N	114	48. E	-	12	1198	0000	13	10	9	7	3	-	-	-	-	-	-
																		00001	STATIONS IN			DEG		SQ		74	
012	4	75	10	10	1955	31 0739	0017	SB	07	02. N	115	40. E	-	10	1047	0000	19	06	9	9	8	-	-	-	-	-	-
012	4	75	10	18	1955	31 0739	0026	SB	07	03. N	115	31. E	4005	12	1156	0000	19	06	9	-	-	-	-	-	-	-	-
																		00002	STATIONS IN			DEG		SQ		75	
012	4	79	05	02	1961	31 0685	0005	RH	07	49. N	119	59. E	3980	41	4084	0000	29	15	9	9	9	-	-	-	-	-	-
																		00001	STATIONS IN			DEG		SQ		79	
012	3	81	10	24	1955	31 0739	0115	HO	08	00. N	111	33. E	3840	11	1074	0000	19	06	9	7	-	-	-	-	-	-	-
																		00001	STATIONS IN			DEG		SQ		81	
012	4	85	10	09	1955	31 0739	0016	SB	08	00. N	115	37. E	4114	11	1122	0000	19	06	9	9	-	-	-	-	-	-	-
012	4	85	10	18	1955	31 0739	0027	SB	08	02. N	115	40. E	3749	12	1197	0000	19	07	9	-	-	-	-	-	-	-	-
																		00002	STATIONS IN			DEG		SQ		85	
012	3	91	10	23	1955	31 0739	0113	HO	09	58. N	111	28. E	3402	11	1060	0000	19	06	9	9	-	-	-	-	-	-	-
012	3	91	10	24	1955	31 0739	0114	HO	09	00. N	111	25. E	3913	11	1150	0000	19	06	9	9	-	-	-	-	-	-	-
																		00002	STATIONS IN			DEG		SQ		91	
012	4	95	10	09	1955	31 0739	0015	SB	09	06. N	115	44. E	4023	10	0958	0000	19	05	9	9	9	-	-	-	-	-	-
012	4	95	10	19	1955	31 0739	0028	SB	09	03. N	115	48. E	3640	09	-	0000	00	-	-	-	-	-	-	-	-	-	-
012	4	95	10	19	1955	31 0739	0029	SB	09	58. N	115	58. E	4023	12	1160	0000	19	06	9	-	-	-	-	-	-	-	-
																		00003	STATIONS IN			DEG		SQ		95	
12	4	55	10	11	1955	31 0739	0019	SB	05	00. N	115	36. E	4169	28	2807	0000	20	15	9	9	9	-	-	-	-	-	-
																		00001	STATIONS IN			DEG		SQ		55	
012	4	59	05	29	1952	31 436	0026	HO	05	52.5N	119	20. E	4114	22	-	0000	00	-	-	9	9	-	-	-	9	-	-	-

42

APPENDIX 6

Oceanographic Station Data Plot

43


SALINITY
TEMPERATURE
DEPTH
PO4
O2
CONSECUTIVE NO.
CRUISE NO.
LAT 08°00.0'N LONG 082°30.0'W
SIGMA-T

APPENDIX 7

Station Data Inventory Plot by 5° Square - Number of Stations

MEDITERRANEAN
OCEANOGRAPHIC STATION DATA
NUMBER OF OBSERVATIONS IN ARCHIVES AS OF
1 JAN 1968
APR-JUN - 2,404 STATIONS

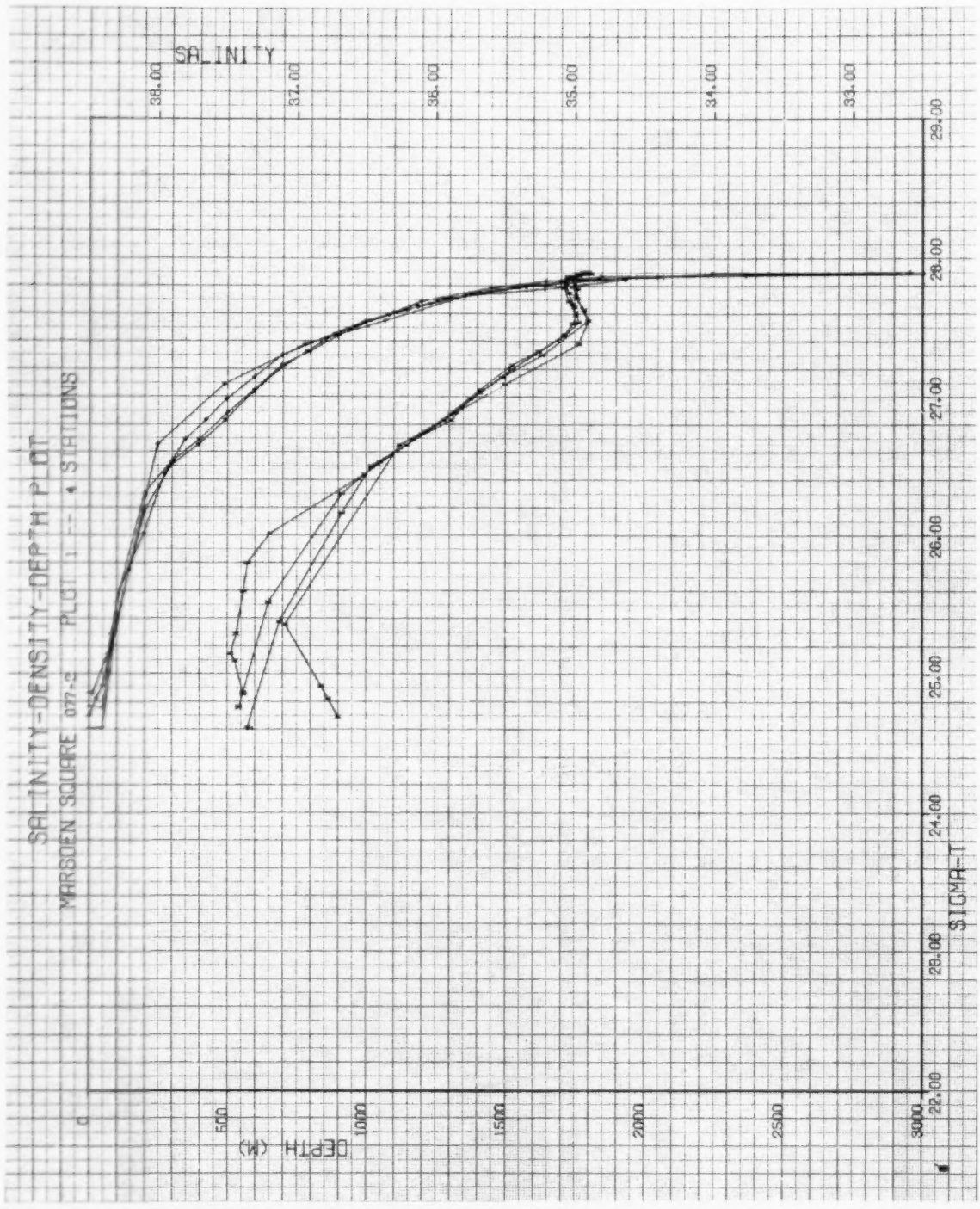
APPENDIX 8

Station Data Inventory Plot by 5° Square - Point Locations

MEDITERRANEAN
OCEANOGRAPHIC STATION DATA
STATION LOCATION CHART
APR MAY JUN — 2,404 STATIONS

APPENDIX 9

Composite Plot of Salinity and Depth vs. Sigma-t


SALINITY-DENSITY-DEPTH PLOT
MARSDEN SQUARE 077-2 PLOT 1 -- 4 STATIONS
SALINITY
38.00
37.00
36.00
35.00
34.00
33.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
SIGMA-T
DEPTH (M)
500
1000
1500
2000
2500
3000

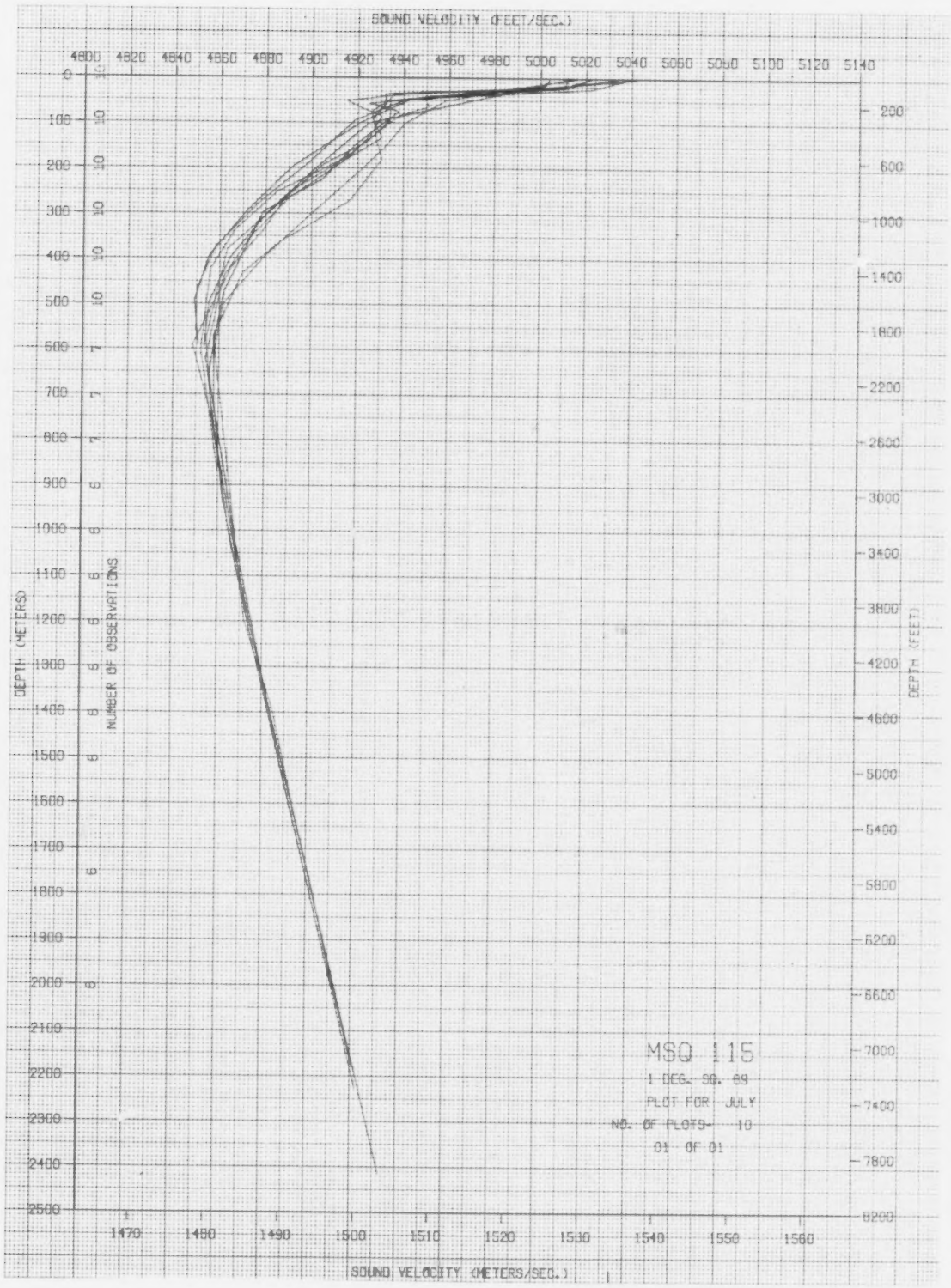
APPENDIX 10

Cruise Track - Mercator Projection

CRUISE 90 0092

APPENDIX 11

Sound Velocity - Depth Profile


SOUND VELOCITY (FEET/SEC.)
4800 4820 4840 4860 4880 4900 4920 4940 4960 4980 5000 5020 5040 5060 5080 5100 5120 5140
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
DEPTH (METERS)
NUMBER OF OBSERVATIONS
10 10 10 10 7 7 6 6 6 6 6 6 6 6
200 600 1000 1400 1800 2200 2600 3000 3400 3800 4200 4600 5000 5400 5800 6200 6600 7000 7400 7800 8200
DEPTH (FEET)
1470 1480 1490 1500 1510 1520 1530 1540 1550 1560
SOUND VELOCITY (METERS/SEC.)
MSQ 115
1 DEC. 90. 89
PLOT FOR JULY
NO. OF PLOTS- 10
01 OF 01

APPENDIX 12

Sound Velocity and Temperature Summary Listing

SUMMARY FOR ONE DEGREE SQUARE 36 OF MARSDEN SQUARE 80 FOR MONTH 8

DEPTH	VELOCITY				VELOCITY GRADIENT				TEMPERATURE					TEMPERATURE GRADIENT			
	NO	AVG	S D	MAX	MIN	NO	AVG	MAX	MIN	NO	AVG	S D	MAX	MIN	NO	AVG	MAX	MIN
0.	13	1546.3	0.9	1547.9	1545.4	0	0.0	0.0	0.0	15	29.24	0.38	30.04	28.86	0	0.00	0.00	0.00
10.	15	1546.2	0.8	1547.7	1545.4	15	-0.0	1.2	-1.2	15	29.16	0.34	29.85	28.84	15	-0.15	0.30	-0.67
20.	15	1546.1	0.6	1547.4	1545.5	15	0.0	3.0	-1.2	15	29.03	0.28	29.64	28.76	15	-0.36	0.06	-0.79
30.	15	1545.8	0.6	1547.5	1544.6	15	-0.7	1.5	-3.2	15	28.83	0.30	29.54	28.18	15	-0.60	0.46	-2.59
50.	15	1543.8	2.0	1546.7	1540.3	15	-3.2	0.3	-6.6	15	27.76	0.85	28.96	26.26	15	-1.68	-0.09	-3.20
75.	15	1540.8	1.1	1543.1	1539.0	13	-3.7	0.4	-10.2	15	26.26	0.48	27.28	25.41	15	-2.00	-0.18	-5.23
100.	15	1539.1	1.1	1540.8	1536.4	15	-1.8	-0.3	-4.3	15	25.30	0.47	26.06	24.11	15	-1.05	-0.30	-2.05
125.	15	1537.9	1.0	1539.2	1535.7	14	-1.5	-0.9	-2.9	15	24.58	0.43	25.12	23.65	14	-0.89	-0.56	-1.43
150.	15	1536.1	0.9	1538.0	1534.6	14	-2.3	-0.9	-3.2	15	23.64	0.35	24.45	23.08	15	-1.15	-0.59	-1.49
200.	15	1530.1	2.1	1533.5	1526.8	14	-3.9	-1.0	-5.9	15	21.01	0.77	22.26	19.84	15	-1.71	-0.60	-2.42
250.	15	1526.3	2.5	1531.3	1524.1	14	-2.1	-1.2	-2.9	15	19.36	0.86	21.11	18.59	14	-0.91	-0.61	-1.23
300.	15	1524.1	2.3	1529.0	1522.4	9	-1.1	-0.4	-1.5	15	18.33	0.79	19.97	17.74	9	-0.54	-0.32	-0.74
400.	15	1520.6	1.8	1524.2	1518.6	12	-1.2	-0.7	-1.6	15	16.66	0.54	17.73	16.05	13	-0.56	-0.37	-0.71
500.	9	1515.7	2.2	1519.1	1513.6	8	-1.5	-1.3	-2.2	9	14.65	0.62	15.64	14.12	9	-0.68	-0.52	-0.85
600.	9	1509.3	2.5	1513.0	1505.4	7	-2.0	-1.7	-2.8	9	12.33	0.66	13.32	11.25	9	-0.67	-0.33	-0.91
700.	9	1503.6	2.6	1507.1	1498.4	6	-1.7	-1.5	-1.8	9	10.34	0.68	11.22	8.97	7	-0.60	-0.54	-0.64
800.	8	1498.5	2.9	1501.3	1492.3	7	-1.4	-1.0	-1.9	9	8.65	0.73	9.34	6.99	8	-0.52	-0.41	-0.62
900.	7	1493.6	2.6	1497.0	1489.1	4	-1.4	-1.3	-1.5	9	7.05	0.65	7.69	5.78	7	-0.51	-0.45	-0.61
1000.	7	1490.6	1.6	1493.5	1489.1	5	-0.9	-0.1	-1.3	8	5.81	0.41	6.41	5.37	8	-0.31	-0.12	-0.44
1100.	6	1489.3	0.9	1491.1	1488.5	6	-0.3	-0.0	-0.7	7	5.07	0.25	5.42	4.83	7	-0.22	-0.14	-0.30
1200.	6	1489.1	0.4	1489.7	1488.8	4	-0.1	0.1	-0.4	7	4.60	0.11	4.79	4.49	7	-0.14	-0.08	-0.22

APPENDIX 13

Vertical Array Summary Listing

NODC STATION DATA VERTICAL ARRAY SUMMARY

MARSDEN SQUARE 130

1 DEGREE SQUARE 20

MONTH OR YEAR 11

	TEMPERATURE					SALINITY				
DEPTH	MAX	AVG	MIN	OBS	SD	MAX	AVG	MIN	OBS	SD
0000	24.20	23.71	22.89	008	0.50	34.70	34.59	34.45	008	0.08
0010	24.50	23.86	22.91	008	0.55	34.65	34.56	34.45	008	0.07
0020	24.50	23.85	22.88	008	0.56	34.65	34.58	34.47	008	0.06
0030	24.48	23.84	22.87	008	0.56	34.70	34.60	34.48	008	0.07
0050	24.40	23.78	22.84	008	0.59	34.87	34.62	34.49	008	0.11
0075	24.41	23.22	20.54	008	1.31	34.95	34.68	34.50	008	0.14
0100	24.20	22.65	18.90	008	1.85	35.00	34.72	34.54	008	0.15
0125	23.55	21.37	18.30	008	1.74	35.02	34.80	34.63	008	0.10
0150	22.21	20.23	17.65	008	1.57	35.03	34.85	34.72	008	0.09
0200	20.40	18.73	16.54	008	1.31	34.92	34.83	34.72	008	0.06
0250	18.85	17.67	16.20	008	0.92	34.83	34.77	34.70	008	0.05
0300	17.49	16.53	15.64	008	0.63	34.76	34.71	34.67	008	0.03
0400	15.03	13.90	12.30	007	0.98	34.74	34.57	34.47	007	0.08
0500	12.63	10.95	08.00	007	1.50	34.46	34.38	34.27	007	0.06
0600	10.06	08.32	06.60	007	1.07	34.30	34.24	34.18	007	0.04
0700	07.88	06.49	05.40	007	0.80	34.44	34.24	34.08	007	0.10
0800	06.09	05.10	04.40	007	0.63	34.55	34.28	34.07	007	0.14
0900	04.73	04.42	03.85	004	0.35	34.51	34.37	34.29	004	0.09
1000	03.80	03.63	03.46	002	0.17	34.45	34.44	34.43	002	0.01

NODC STATION DATA VERTICAL ARRAY SUMMARY

MARSDEN SQUARE 130

1 DEGREE SQUARE 20

MONTH OR YEAR 11

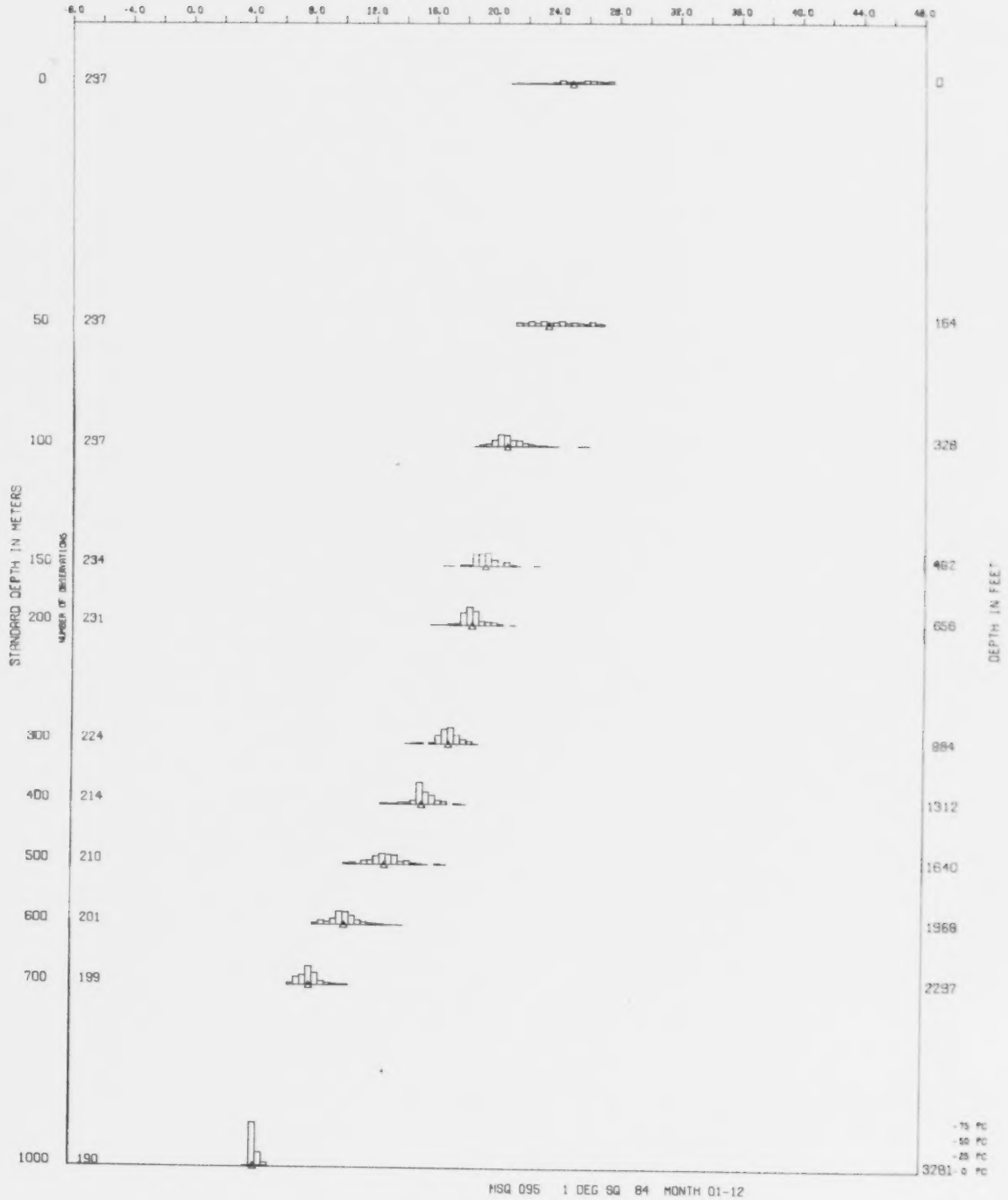
	SIGMA T					OXYGEN				
DEPTH	MAX	AVG	MIN	OBS	SD	MAX	AVG	MIN	OBS	SD
0000	23.71	23.44	23.22	008	0.16	04.98	04.87	04.79	006	0.06
0010	23.70	23.37	23.11	008	0.19	05.02	04.85	04.72	006	0.09
0020	23.72	23.39	23.11	008	0.18	05.02	04.85	04.71	006	0.10
0030	23.76	23.41	23.13	008	0.19	05.05	04.86	04.76	006	0.09
0050	23.89	23.44	23.18	008	0.24	04.99	04.84	04.73	006	0.10
0075	24.60	23.64	23.22	008	0.47	04.86	04.78	04.69	006	0.07
0100	25.07	23.83	23.26	008	0.62	04.84	04.70	04.56	006	0.11
0125	25.23	24.25	23.62	008	0.52	04.70	04.62	04.52	006	0.07
0150	25.39	24.60	24.08	008	0.42	04.72	04.56	04.45	006	0.09
0200	25.44	24.97	24.56	008	0.29	04.76	04.54	04.42	006	0.11
0250	25.49	25.19	24.91	008	0.20	04.63	04.37	03.76	006	0.29
0300	25.59	25.42	25.21	008	0.14	04.62	04.26	03.50	006	0.37
0400	26.14	25.89	25.67	007	0.16	04.27	03.99	03.75	005	0.23
0500	26.72	26.31	26.07	007	0.22	03.96	03.56	02.99	005	0.35
0600	26.89	26.65	26.40	007	0.16	03.47	03.02	02.44	005	0.39
0700	27.14	26.91	26.69	007	0.15	02.95	02.49	01.98	005	0.36
0800	27.38	27.11	26.97	007	0.14	02.40	02.05	01.60	005	0.30
0900	27.43	27.26	27.17	004	0.10	01.84	01.82	01.78	003	0.03
1000	27.42	27.40	27.38	002	0.02	01.72	01.72	01.72	001	

APPENDIX 14

Vertical Array Summary Histogram Plot

TEMPERATURE

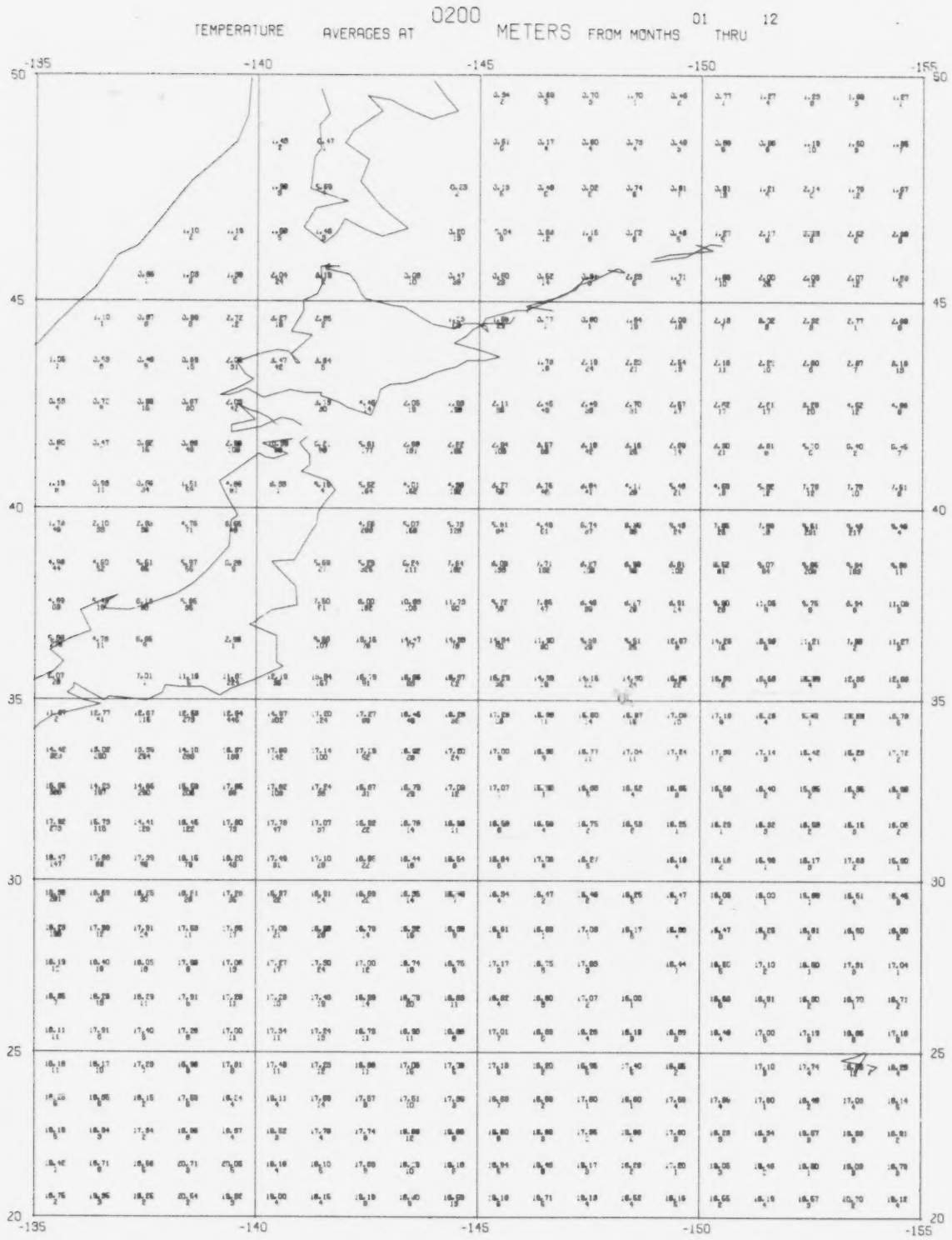
FREQUENCY DISTRIBUTION HISTOGRAM



MSQ 095 1 DEG SQ 84 MONTH 01-12

APPENDIX 15

Horizontal Summary Plot of Temperature at 200 Meters for Months 1 Through 12


TEMPERATURE AVERAGES AT 0200 METERS FROM MONTHS 01 THRU 12
-135
-140
-145
-150
-155
50
45
40
35
30
25
20

62

APPENDIX 16

Bathythermograph Data Listing

NODC BATHYTHERMOGRAPH

(Depth in Meters)

IDENTIFIERS					AREA		DATE		TIME		POSITION		DEPTH		WIND		AIR TEMP		BAR	W	CL	WAVE		BT COR		REP TEMP		CODES		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
06581	125	2	31	25	081	50	22	12	64	0921	2540N	08000W		27	3	36514		235	207		1		73			-05	3	254	E	0105	14

33	34	SHIP NAME	35	36	37	38	39	40	41	42
G-6422	0278	GERDA								02

FIELD 43 →

0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
251	251	251	251	251	251	251	244	241	239	239	238	238	237	235	235	234	230	220	212
100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195
201	182	180	178	170	152	155	153	151	149	145	137	135	134	134	130	124	122	119	117
200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295
115	113	102	085	084	083	081	080	076	074	073	071	070	069	066					
300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395
400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495

44	45
1	03
44	45
1	04
44	45
1	05
44	45
44	45

85

64

EXPLANATION SHEET
NODC BT MACHINE PRINTOUT 1 May 1964

(OUTPUT)

EXPLANATION OF ENTRIES
(to be used with overlay template)

General: This listing contains the digitized information from analog BT prints (or slides and log sheet). The first and second lines contain identifying reference number, time-date, position, surface environmental data, certain code entries, etc. The third and following lines contain the temperatures read from the BT trace in Degrees Centigrade at Depth Increments of 3 Meters.

Tables referred to in this explanation may be found in "Instructions for Manually Digitizing Bathythermograph (BT) Data."

NOTE: This is an OUTPUT LISTING.
All Units of Depth And Temperature Have Been Converted And/Or Interpolated to Metric Units.

EXPLANATION OF ENTRIES BY FIELD

Field

1 NODC REFERENCE IDENTITY NUMBER. An archive retrieval and reference number assigned by NODC.

2 CONSECUTIVE PRINT NUMBER. Assigned by NODC.

3 QUALITY CODE. See Table 1. The code is based on a first subjective estimate of the reliability of the temperatures indicated by the BT trace at any particular depth. The quality code does not apply to the change in temperature with depth; all BT's digitized by NODC are presumed to be accurate (within the limits of the BT instrument system) in respect to the vertical temperature structure.

NOTE: A negative sign preceding the quality code denotes the standard precision of read-out of + 0.1 degree could not be achieved (poor image, blurred trace, etc.).

4 COUNTRY CODE. See table II. Entry reflects nationality of the agency operating the vessel.

5 INSTITUTE CODE. See table III. Institute operating the vessel, cruise, or BT program of cruise. A BT obtained while on an Ocean Weather Station is identified by the Ocean Station letter designator following the institute code.

6 MARSDEN SQUARE.

7 UNIT SQUARE. 1° square number.

EXPLANATION SHEET
NODC BT MACHINE PRINTOUT
(Continued)

Field	
8	DAY. (GMT)
9	MONTH. (GMT)
10	YEAR.
11	HOUR AND MINUTES. (GMT) If 3 digits are shown, tenths of hours are given in place of minutes.
12	LATITUDE. Degrees and minutes of latitude, N or S. When given to 3 digits, tenths of degrees are given in place of minutes.
13	LONGITUDE. Degrees and minutes of longitude, E or W. When given 4 digits, tenths of degrees are given in place of minutes.
14	DEPTH OF BOTTOM. See Unit Code, Field 32, and Table IX for units (generally fathoms).
15	MAXIMUM TRACE DEPTH. Maximum depth of trace in tens of meters, feet, or fathoms. See Field 32 and Table IX for units.
16	DEPTH OF GRID. See Table IV.
17	WIND DIRECTION. See Table V. (WMO Code 0877).
18	WIND SPEED. (Force) When preceded by letter S, wind speed is given in knots; when preceded by the letter F, wind force is given in the Beaufort scale.
19	AIR TEMPERATURE. Dry bulb reading. For units see Field 32 and Table IX.
20	AIR TEMPERATURE. Wet bulb reading. For units see Field 32 and Table IX.
21	BAROMETRIC PRESSURE. Tens, units, and tenths of millibars. (The tenths digit is generally not reported prior to 1963).
22	WEATHER. WMO Code 4501.
23	CLOUD TYPE AND AMOUNT. For cloud type see Table VI (WMO Code 0500) followed by cloud amount, see Table VII (WMO Code 2700).
24	WAVE HEIGHT AND PERIOD. The first two columns are the height of the wind waves in whole feet or meters. (When height is given in meters the letter m will prefix the wave height entry). The last two numerals give the wave period in seconds. Sea state (generally in Douglas Code) may be given in place of wave height and period. In this case the wave period is left blank and the Sea State Code is given with the letter X as prefix.

EXPLANATION SHEET
NODC BT MACHINE PRINTOUT
(Continued)

Field	
25	TCS. The TCS (Temperature Correction Slide) applied to the slide is given in degrees and tenths. For units see Field 32, Table IX. If TCS is not known (or known and not applied) field is blank. Some of the historical data has had a camera correction factor entered in the TCS field rather than the computed TCS. If special slide corrections have been applied they are included in the TCS.
26	DSP. Depth correction applied to slide. Units are the same as grid depth units. This field is rarely reported for historical data.
27	REFERENCE TEMPERATURE CODE. See Table VIII.
28	THE REFERENCE TEMPERATURE. The reference temperature to tenths of degree C. (NOTE: Temperatures reported in whole °F are converted to the nearest tenths of °C).
29	INSTRUMENT CODE. Assigned by NODC. Appears only on BT's processed without TCS correction. This code will allow computer determination of TCS and correction of temperatures by computer.
30	INSTRUMENT TYPE. Mechanical BT is coded as 01.
31	CARD COUNT. Number of output cards. Number shown should match the number of the last detail card (Field 45.)
32	UNIT CODE. See Table IX. The unit code entry denotes the units of depth, temperature sounding, etc., as punched on the INPUT card.
33	ORIGINATOR'S CRUISE NUMBER.
34	ORIGINATOR'S SLIDE NUMBER.
35	SHIP'S NAME.
36	SHIP'S NUMBER. This is an optional entry. At this time, entry is determined by the originator or cognizant institute.
37-40	This fields are intended for future use. They will allow cross-reference with pertinent oceanographic station data.
41	FOR NODC USE ONLY. (The entry NODC denotes that NODC has assigned a number in lieu of the originator's cruise number. Used only where digitization is performed geographically rather than by cruise).
42	CARD TYPE 02. Reference card identifier.
43	BT TEMPERATURE VALUES. BT temperature values to tenths of a degree at successive depths of 5 meters Negative temperatures are preceded by a negative sign.

EXPLANATION SHEET
NODC BT MACHINE PRINTOUT
(Continued)

Field	
44	INPUT-OUTPUT CODE. Entry 1 denotes that the temperature and depth values were read in meters and centigrade and no computer conversion was necessary. Entry 9 indicates that temperatures were converted from °F and interpolated for standard metric depth intervals. (9 also appears where temperatures were in °C but depths were non-metric and interpolation was necessary. See unit code for original units.
45	CARD NUMBER. 03 is number of first detail card. Number of last card shown should match entry in Field 31.

APPENDIX 17

Magnetic Tape Format for Bathythermograph Data .

IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA
OUTPUT FORMAT

RECORD-1 GENERAL DESCRIPTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
IDENTIFIER NODC REF. NO. | CONSEC NO.								FOR DESCRIPTION OF COLUMNS 9 – 50 SEE MASTER REFERENCE AND DETAIL CARD LAYOUTS																																													

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FOR DESCRIPTION OF COLUMNS 51 – 78 SEE MASTER, REFERENCE AND DETAIL CARD LAYOUTS																												CARD NO.		13			16			19			22			25			28			31			34			37			40			43			46			49			52			55			58			61			64			67			70		

RECORD-2 RECORD-3 RECORD N

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	1	2	3	·	·	·	120	1	2	3	·	·	·	120	·	·	·	·	·	·	·	1	2	3	·	·	·	120	TAPE MARK TM
08	09	23	30	32	35	50	53	60	79	80	MONTH		1° SQ		MARSDEN SQ																																			

ZONE EDIT NUMBER CODES FOR POSITIONS 81 – 111:
BLANK – EDITED COLUMN CONTAINED NO ZONE PUNCHES
1 – EDITED COLUMN CONTAINED AN "11" (OR "X") ZONE
2 – EDITED COLUMN CONTAINED A "12" (OR "Y") ZONE
3 – EDITED COLUMN CONTAINED A ZERO ZONE (NOT DIGIT 0)

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IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA

OUTPUT FORMAT

MASTER CARD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
IDENTIFIER									ORIGIN				OBV		DATE / TIME (GMT)								MARSDEN				POSITION										DEPTH						WIND				AIR TEMP		
NODC	REF. NO.				CONSEC NO.			QUAL. ZONE	COUNTRY		INST.		LETTER		DAY		MONTH		YEAR		HOUR		MIN.	SQ.				LAT°		′		LONG°		′			BOTTOM				TRACE	GRID	DIR.		F/S		DRY		

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80					86					92	93	94				99	
																												0	1																	
TEMP. WET			BAROMETER			W	CLOUD TYPE	AMT	WAVE H/A		P_w		TCS		DSP		REF. TYPE	TEMP.		C	INSTR. TYPE		CARD COUNT		UNIT CODE		CARD NO.						28					46	49	52				67	

101	102	103	104	105	106	107	108	109		111	112	113	114	115	116	117	118	119	120																														
08	09	23	30	32	35	50	53	60		80	MONTH		1° SQ.		MARSDEN SQ.																																				

IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA

OUTPUT FORMAT

REFERENCE CARD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
IDENTIFIER NODC REF. NO. | CONSEC NO.								BLANK						SHIP NUMBER					ORGINATORS CRUISE NUMBER | SLIDE NO.												CRUISE NUMBER							ORIGINAL OCEAN STATION NUMBER							NODC CRUISE NO.		NODC CONSEC NO.	

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
NODC CONSEC NO		SHIP NAME																										CARD NO.	

101	102								110		112	113	114	115	116	117	118	119	120
08	09								79		MONTH	1° SQ.			MARSDEN SQ				

IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA

OUTPUT FORMAT

DETAIL CARD (03-07)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1–9 IDENTICAL TO MASTER CARD									CODE	TEMP. 1			TEMP. 2			TEMP. 3			TEMP. 4			TEMP. 5			TEMP. 6			TEMP. 7			TEMP. 8			TEMP. 9			TEMP. 10			TEMP. 11			TEMP. 12			TEMP. 13			T 14

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
TEMP 14			TEMP 15			TEMP 16			TEMP 17			TEMP 18			TEMP 19			TEMP 20											CARD NO.		13	16	19	22	25	28	31	34	37	40	43	46	49	52	55	58	61	64	67	70

101	102										112	113	114	115	116	117	118	119	120																																	
08	09										MONTH		1° SQ.		MARSDEN SQ.																																					

IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA

OUTPUT FORMAT

DETAIL CARD (50)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1-9 IDENTICAL									CODE	DEPTH 1			TEMP. 1			DEPTH 2			TEMP. 2			DEPTH 3			TEMP. 3			DEPTH 4			TEMP. 4			DEPTH 5			TEMP 5			DEPTH 6			TEMP 6			DEPTH 7			T 7

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80		82		84		86		88		90		92		94		96		98		100
TEMP 7			DEPTH 8			TEMP. 8			DEPTH 9			TEMP 9			DEPTH 10			TEMP 10											CARD NO.			16		22		28		34		40		46		52		58		64		70

101	102										112	113	114	115	116	117	118	119	120																																		
08	09										MONTH		1° SQ.		MARSDEN SQ.																																					

IBM 7074 TAPE RECORD LAYOUT

BATHYTHERMOGRAPH DATA

INPUT FORMAT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
								*																																											
NODC	IDENTIFIER REF. NO.							CONSEC. NO.	SEE CARD LAYOUT FOR POSITION 9 — 78																																														

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
																												CARD NO.	13	16	19	22	25	28	31	34	37	40	43	46	49	52	55	56	61	64	67	70

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
08	09	23	30	32	35	50	53	60	79	80									

* COLUMN 9 IS BLANK ON INPUT DETAIL CARD.

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75

APPENDIX 18

BT Geographical Inventory Listing

INVENTORY OF GEOSORTED B1 DATA AS OF 30 SEP 68

MARSDEN SQUARE 909

FIVE DEGREE SQUARES 1,2

ID	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
00	1962								2					2
1D	TOT % 00¤								2					2
01	1962								1					1
1D	TOT % 01¤								1					1
02	1962								1					1
1D	TOT % 02¤								1					1
03	1962								2					2
1D	TOT % 03¤								2					2
05	1962								1					1
1D	TOT % 05¤								1					1
07	1962								1					1
1D	TOT % 07¤								1					1
08	1962								1					1
1D	TOT % 08¤								1					1
5D	TOT % 1 ¤								6					6
5D	TOT % 2 ¤								3					3
MSQ	TOT %909¤								9					9

TOI

APPENDIX 19

BT Archive Inventory Listing

BATHYTHERMOGRAPH DATA PROGRAM

ARCHIVE INVENTORY

2 SEPTEMBER 1968
(REPLACES LISTING DATED 15 MAY 1968)

EXPLANATION OF HEADING SYMBOLS

CR NO — NODC CRUISE REFERENCE NUMBER

OBS DIGIT — NO. OF STATIONS DIGITIZED

ORIG CR NO — ORIGINATOR'S CRUISE NUMBER

FM DATE TO — MONTH-YEAR OF FIRST AND LAST STATIONS IN CRUISE

Q-CY-IT — NODC CODES
Q QUALITY CODE
CY ORIGINATING COUNTRY
IT ORIGINATING INSTITUTION

SHIP — VESSEL'S NAME

OBS REC'D TOTAL — STATIONS RECEIVED

MODE — FORMAT OF STATIONS RECEIVED
S SLIDES
A ANALOG PRINT
X EXPENDABLE BT
E ELECTRONIC BT
P PUBLISHED
M MANUSCRIPT
F FILM
T TAPE

STATUS — STAGE OF PRODUCTION
D DEFERRED
A ANALOG
O OZALID
R REJECTED
P IN PROCESSING
F FINAL-EDP INPUT
T TAPE EDP OUTPUT

AREA — CODE FOR GENERAL GEOGRAPHICAL AREA CONTAINING MAJORITY OF STATIONS FROM CRUISE

EXPLANATION OF SUMMARY (STATUS) SYMBOLS

T STATIONS DIGITIZED ARCHIVED ON MAGNETIC TAPE AS DATA OUTPUT

F STATIONS DIGITIZED ARCHIVED ON EAM CARDS AS DATA INPUT WILL BE TRANSFERED TO MAGNETIC TAPE

P STATIONS IN DIGITIZING PROCESS-IN CODING, KEYPUNCH OR CHECKLIST PRODUCTION STAGE

U INDIVIDUAL STATIONS WITHIN CRUISE CONSIDERED UNSUITABLE FOR DIGITIZATION (OBS REC'D MINUS OBS DIGIT)

R ALL STATIONS WITHIN CRUISE UNSUITABLE FOR DIGITIZATION

O STATIONS IN OZALID PRODUCTION

A STATIONS IN ANALOG PRODUCTION

D STATIONS BEING DEFERRED (BACKLOG)

CR NO	OBS DIGIT	ORIG CR NO	FM DATE	TO	QUALITY ORDER-	SHIP ALPHA SHIP'S NAM	OBS RECD	MODE	DECK	STATUS	AREA
D											
D											
06000	34		09 67	12 63	2-31-05	ABILITY	39	S		O PFT	BTQ5
30983			02 64	02 64	-31-05	ABILITY	10	S	D		BTQ4
22575			08 68	09 66	-31-06	ABSECON	119	S		AO	BTQ4
22485	67		07 68	08 68	-31-05	ACME	72	S		AO P	BT17
08274	173		06 66	11 66	-31-05	BERRY, CHARLES	186	S	S D	PF	BT15
05722	32		01 63	02 63	4-31-05	BERRY, FRED T.	38	S		O PFT	BTQ5
09225	6	CFD 164	11 67	11 67	1-31-02	CRAWFORD	6	A		PF	BTQ4
00609	1		10 55	11 55	4-31-05	CURRIER	13	S		AO PFT	BT11
02847	9		05 59	08 59	4-31-05	CURRIER	22	S		DAO P	BT19
0000134	00000322 *						22	S		DAO P	BT19
							00000505 **				
							00000451 *				
	00000067 T						00000054	U			
	00000179 F							R			
	00000076 P						00000119	O			
								A			
							00000010	D			

CR NO	OBS DIGIT	ORIG CR NO	FM DATE	TO	ORDER-	NODC REFERENCE N	OBS RECD	MODE	DECK	STATUS	AREA
D											
D											
00609	1		10 55	11 55	4-31-05	CURRIER	13	S		AO PFT	BT11
02847	9		05 59	08 59	4-31-05	CURRIER	22	S		DAO P	BT19
05722	32		01 63	02 63	4-31-05	BERRY, FRED T.	38	S		O PFT	BTQ5
06000	34		09 63	12 63	2-31-05	ABILITY	39	S		O PFT	BTQ5
08274	173		06 66	11 66	-31-05	BERRY, CHARLES	186	S	S D	PF	BT15
09225	6	CFD 164	11 67	11 67	1-31-02	CRAWFORD	6	A		PF	BTQ4
22485	67		07 68	08 68	-31-05	ACME	72	S		AO P	BT17
22575			08 68	09 66	-31-06	ABSECON	119	S		AO	BTQ4
30983			02 64	02 64	-31-05	ABILITY	10	S		D	BTQ4
0000111*	00000322 *						00000505 **				
							00000451 *				
	00000067 T						00000054	U			
	00000179 F							R			
	00000076 P						00000119	O			
								A			
							00000010	D			

CR NO	OBS DIGIT	ORIG CR NO	FM DATE	TO	ORDER-	CHRONOLOGICAL	OBS RECD	MODE	DECK	STATUS	AREA
D											
D											
00609	1		10 55	11 55	4-31-05	CURRIER	13	S		AO PFT	BT11
02847	9		05 59	08 59	4-31-05	CURRIER	22	S		DAO P	BT19
05722	32		01 63	02 63	4-31-05	BERRY, FRED T.	38	S		O PFT	BTQ5
06000	34		09 63	12 63	2-31-05	ABILITY	39	S		O PFT	BTQ5
30983			02 64	02 64	-31-05	ABILITY	10	S	D		BTQ4
08274	173		06 66	11 66	-31-05	BERRY, CHARLES	186	S	S D	PF	BT15
09225	6	CFD 164	11 67	11 67	1-31-02	CRAWFORD	6	A		PF	BTQ4
22485	67		07 68	08 68	-31-05	ACME	72	S		AO P	BT17
22575			08 68	09 66	-31-06	ABSECON	119	S		AO	BTQ4
0000111*	00000322 *						00000505 **				
							00000451 *				
	00000067 T						00000054	U			
	00000179 F							R			
	00000076 P						00000119	O			
								A			
							00000010	D			

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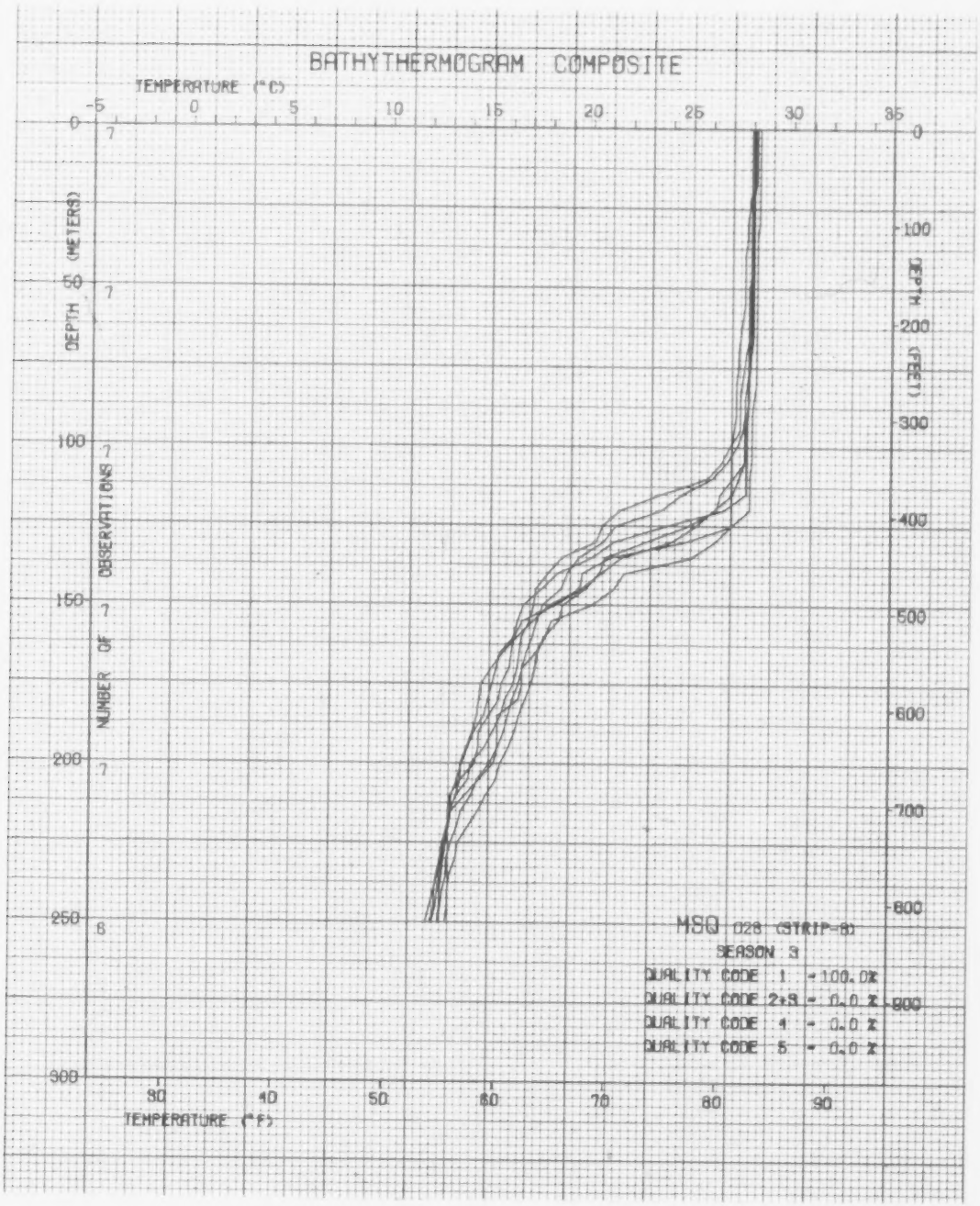
APPENDIX 20

Bathythermogram Composite Plot


BATHYTHERMOGRAM COMPOSITE
TEMPERATURE (°C)
-5
0
5
10
15
20
25
30
35
DEPTH (METERS)
NUMBER OF OBSERVATIONS
0
50
100
150
200
250
300
DEPTH (FEET)
100
200
300
400
500
600
700
800
900
80
40
50
60
70
80
90
TEMPERATURE (°F)
MSQ 028 (STRIP-8)
SEASON 3
QUALITY CODE 1 = 100.0%
QUALITY CODE 2+3 = 0.0 %
QUALITY CODE 4 = 0.0 %
QUALITY CODE 5 = 0.0 %

APPENDIX 21

Gradient Summary for Thermocline Depth

TEMPERATURE GRADIENT SUMMARY BY 1-DEG SQ AND MONTHS

MSQ DSQ
003 54

AVG TEMP DIFFERENCES FOR SELECTED DEPTH INTERVALS BY MONTH WITH COUNT OF OBS

DEPTH	JAN	OBS	FEB	OBS	MAR	OBS	APR	OBS	MAY	OBS	JUN	OBS	JUL	OBS	AUG	OBS	SEP	OBS	OCT	OBS	NOV	OBS	DEC	OBS
0-20	.00		.00		.10	1	.10	2	.00		.00		.00		.03	3	.00		.05	2	.00		.00	
20-40	.00		.00		.10	1	.80	2	.00		.00		.00		.07	3	.00		.25	2	.00		.00	
40-60	.00		.00		5.00	1	4.65	2	.00		.00		.00		.60	3	.00		3.30	2	.00		.00	
60-80	.00		.00		5.00	1	4.75	2	.00		.00		.00		4.20	4	.00		4.90	2	.00		.00	
80-100	.00		.00		2.00	1	3.30	2	.00		.00		.00		3.43	4	.00		4.10	2	.00		.00	
100-120	.00		.00		.60	1	1.15	2	.00		.00		.00		2.30	4	.00		.00		.00		.00	
120-140	.00		.00		.40	1	.70	2	.00		.00		.00		2.25	4	.00		.00		.00		.00	
140-160	.00		.00		.50	1	.30	2	.00		.00		.00		.93	4	.00		.00		.00		.00	
160-180	.00		.00		.40	1	.45	2	.00		.00		.00		.65	4	.00		.00		.00		.00	
180-200	.00		.00		.40	1	.35	2	.00		.00		.00		.53	4	.00		.00		.00		.00	
200-220	.00		.00		.00		.00		.00		.00		.00		.45	4	.00		.00		.00		.00	
220-240	.00		.00		.00		.00		.00		.00		.00		.45	4	.00		.00		.00		.00	
240-260	.00		.00		.00		.00		.00		.00		.00		.35	4	.00		.00		.00		.00	

POSITIVE GRADIENT (.2 DEG C/DEPTH INTERVAL OR MORE) SUMMARY THIS 1-DEG SQUARE

0-20	.00		.00		.00		.00		.00		.00		.00		.50	1	.00		.00		.00		.00	
20-40	.00		.00		.00		.00		.00		.00		.00		.20	1	.00		.00		.00		.00	
40-60	.00		.00		.00		.00		.00		.00		.00		.20	1	.00		.00		.00		.00	
60-80	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
80-100	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
100-120	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
120-140	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
140-160	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
160-180	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
180-200	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
200-220	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
220-240	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	
240-260	.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00		.00	

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APPENDIX 22

Listing of Thermocline and Mixed Layer Depths

1 AVG DEPTH OF THERMOCLINE (OR MIXED LAYER) BY 1-DEG SQ AND MONTH. ADDED DATA IF BTS LISTED INDIVIDUALLY

Q	MSQ	DSQ	MO.	M,L. CRIT	DEPTH OBS	THCL CRIT	DEPTH OBS	CRUISE	YEAR	DAY	HOUR	CONSEC
337	56	03	0.	/10M	M	0.4 /10M	020M 001	05816	63	19	21	0232
337	56	03	0.	/10M	M	0.4 /10M	020M 001					
338	26	08	0.	/10M	M	0.4 /10M	120M 001	05903	63	14	00	0139
338	26	08	0.	/10M	M	0.4 /10M	120M 001					
338	36	08	0.	/10M	M	0.4 /10M	080M 001	05903	63	14	03	0140
338	36	08	0.	/10M	M	0.4 /10M	080M 001	05903	63	14	09	0141
338	36	08	0.	/10M	M	0.4 /10M	080M 002					
338	46	08	0.	/10M	M	0.4 /10M	090M 001	05903	63	14	12	0142
338	46	08	0.	/10M	M	0.4 /10M	090M 001					
338	68	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	15	14	0157
338	68	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	15	15	0158
338	68	08	0.	/10M	M	0.4 /10M	150M 002					
338	69	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	15	16	0159
338	69	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	15	18	0160
338	69	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	15	19	0161
338	69	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	15	20	0162
338	69	08	0.	/10M	M	0.4 /10M	120M 001	05903	63	15	21	0163
338	69	08	0.	/10M	M	0.4 /10M	170M 001	05903	63	15	22	0164
338	69	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	15	23	0165
338	69	08	0.	/10M	M	0.4 /10M	151M 007					
339	60	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	16	00	0166
339	60	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	01	0167
339	60	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	02	0168
339	60	08	0.	/10M	M	0.4 /10M	147M 003					
339	70	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	03	0169
339	70	08	0.	/10M	M	0.4 /10M	130M 001	05903	63	16	05	0170
339	70	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	16	07	0171
339	70	08	0.	/10M	M	0.4 /10M	140M 003					
339	71	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	16	08	0172
339	71	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	16	09	0173
339	71	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	10	0174
339	71	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	11	0175
339	71	08	0.	/10M	M	0.4 /10M	130M 001	05903	63	16	12	0176
339	71	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	13	0177
339	71	08	0.	/10M	M	0.4 /10M	143M 006					
339	72	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	16	15	0178
339	72	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	16	16	0179
339	72	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	21	0180
339	72	08	0.	/10M	M	0.4 /10M	157M 003					
339	82	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	16	22	0181
339	82	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	16	23	0182
339	82	08	0.	/10M	M	0.4 /10M	150M 001	05903	63	16	24	0183
339	82	08	0.	/10M	M	0.4 /10M	150M 003					
339	83	08	0.	/10M	M	0.4 /10M	160M 001	05903	63	17	01	0184
339	83	08	0.	/10M	M	0.4 /10M	170M 001	05903	63	17	02	0185
339	83	08	0.	/10M	M	0.4 /10M	140M 001	05903	63	17	03	0186

APPENDIX 23

Geological Sample Information Listing

LISTING FORMAT
NODC GEOLOGICAL SAMPLE INFORMATION

NODC REF NO.	NODC CONSEC NO.	MARSDEN SQ 10°SQ	MARSDEN SQ 1° SQ	DEPTH RANGE	STATION TIME (GMT) YR	MO	DAY	HR	ORIGINATOR'S IDENTIFICATION SHIP CODE	CRUISE NO.	STAT NO.	SAMPLE COUNT	INST	LATITUDE ACC.	DEG.	MIN 1/100	LONGITUDE DEG.	MIN 1/100	SND DEV.	DEPTH m	CORR	SAMPLE QBT	ANAL	SAMP WT	PHOTO SOIL SAMP	CARD TYPE	CARD NO.	DECK NO.
10732	0013	325	42	8	66	06	21	17	WL	24A	621	AR2	31	07	3	62	07.93N	132	54.6 W	1	4679	1	68	1	1	11	1	01	41
	DEV	COND	TOT WT kg	PREF FL m	PENET m L/Q	DIAM cm L/Q	LENGTH cm	CORE	DIST PORT cm	SEC	EXT	VOLUME cm³	PRESERVATION TYPE	DAC	STRUC	SAMPLING REMARKS													
	12	4	0610	60	01.8	06.9	1369	1	1012	2	4		01	2	4	END OF TGST DECK											2	02	41
	CORE INTERVAL TOP — BOTTOM		MUNSELL COLOR		ODOR	SEDIMENT DESCRIPTION																						
	0002-0009		613YR10/1		2	DK GN ROCK FRAG MN NOD DIAM 2CM GASTR FOS																					3	03	41
	41 9 1234 01 00.6 02.5 0125 3 0010 1 3																										2	04	41
	0000-0006		10YR4/2		1	MED GY-BLK MN FRAG SLABS 2CM TER SAND																					3	05	41
12345	0001	228	69	0	66062416	RW682	7215A	31	26		62	32.18N	110	34.4 W	3	0033	1	23	2	1	11						1	01	41
	12 3 0005 01 01.9 05.3 1328 5 1611 1 1																										2	02	41
	0008-0120		10YR4/2		2	MEDIUM GRAY SILTY CLAY ORGANIC MATERIAL																					3	03	41
	41 5 0001 00 00.8 02.5 0127 1 0026 0 2																										2	04	41
	0000-0008		5YR3/2		3	DARK BROWN GLOBIGERINA OOZE MN STN CO FRAG																					3	05	41
12345	0002	228	98	1	66062310	MW682	19		31	26	2	72	45.9 N	069	28.31W		0062	2	14	1	2	11					1	01	41
	21 1060									610	3																2	02	41
	10YR8/2 3 SANDY OOZE FORAM SHL SL TR PT QTZ PHOS RK																										3	03	41
	61 1208									018	3																2	04	41
	10YR10/2 3 LT GY GRNL SAND ORG MAT FOS CORAL CGL PUM																										3	05	41
16028	1985	283	05	9	66063308	GM2136A731		31	08	3	69	38	N	132	48.8 W	1	4333	3	03	1	1	11					1	01	41
	11 1 0012 06 01.8 02.5 0678 1 0060 3 2																										2	02	41
	0000-0016		10GY4/1		3	LT BRN GRAVELLY CLAY CRT CONTRD CMT CALCRK																					3	03	41
	60 0008									125	3		DREDGE USED AS TRIGGER DEVIC														2	04	41
	20GY10/2 0 LT OLV GY SANDY GRAVEL SI SS SFT STRA ROCK																										3	05	41

APPENDIX 24

Explanation for Geological Sample Information Form

NODC GEOLOGICAL SAMPLE INFORMATION FORM

NODC REFERENCE NUMBER					NODC CONSECUTIVE NUMBER				MARSDEN SQUARE			1 SQ.		DEPTH RANGE	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

SHIP _____ COUNTRY _____

CRUISE NO. _____ CRUISE EXPEDITION DATE FROM _____ TO _____

EXPEDITION PROJECT _____ GENERAL AREA / TOPO. _____

INSTITUTION TAKING SAMPLE _____ INSTITUTION RETAINING SAMPLE _____

SAMPLER TYPE _____ NAVIGATION SYSTEM _____

SENIOR SCIENTIST _____ THIS FORM RECORDED BY _____ DATE _____

MASTER IDENTIFICATION CARD–TYPE 1

REMARKS

GMT				ORIGINATOR'S IDENTIFICATION					POSITION								DEPTH			SAMPLE OBTAINED	TYPE OF ANALYSIS	SAMPLING METHOD	PHOTO			CARD TYPE	CARD NO	DECK NO
YEAR	MONTH	DAY	HOUR	SHIP	CRUISE NUMBER	STATION OR SAMPLE NUMBER	COUNTRY	INSTITUTION	ACCURACY	LATITUDE DEGREE	LATITUDE MINUTE (1/100)	N S	LONGITUDE DEGREE	LONGITUDE MINUTE (1/100)	E W	SOUNDING DEVICE	m	CORRECTION				BOTTOM	SAMPLE				
16 17	18 19	20 21	22 23	24 25	26 27 28 29	30 31 32 33 34 35	36 37	38 39	40	41 42	43 44 45 46	47	48 49	50 51 52 53	54	55 56 57 58	59	60 61	62	63	64	65	66 67 68 69 70 71 72 73 74 75	76	77 78	79 80
																								1		4 1

SAMPLING INFORMATION CARD–TYPE 2

| SAMPLER | | | | | | CORE | | | | | | | | | | | | | | | | | | |

EXPLANATION OF THE NODC LISTING FORMAT

Two types of listings are available: the Archive Listing and the Publication Listing.

The Archive Listing printed on plain tabulating paper is used for routine release of data. Stations are double spaced and are listed in continuous order. Columnar headings are not printed· identification of fields is accomplished by use of a template provided with each listing.

The Publication Listing is identical in format to the Archive Listing but is printed on heavy white paper suitable for photo-offset lithographic reproduction, and includes the columnar heading.

An example of the NODC Publication Listing is shown in Appendix C.

The following is a complete description of the entries, units, and codes appearing on the listing.

CARD TYPE I TEMPLATE

ENTRY		DESCRIPTION OF FIELD
NODC		
	REF. NO.	This number is assigned by NODC for data storage and retrieval purposes. Reference sources for each cruise are available.
	CONSEC. NO.	This number is assigned by NODC consecutively for each station. The NODC Reference and Consecutive Numbers define each station in the NODC archives.
MARS. SQ. 10° SQ. 1° SQ.		Marsden Square number
DEPTH RANGE		This number indicates sounding depth as a range and is used for data storage and retrieval purposes.
STATION TIME (GMT)		Date and time given by originator in GMT.
YR.		Year
MO.		Month
DAY		Day of month
HR.		Station hour to nearest hour

EXPLANATION OF THE NODC LISTING FORMAT
(Continued)

ENTRY	DESCRIPTION OF FIELD
ORIGINATOR's IDENTIFICATION	
SHIP CODE	NODC Ship code. This code indicates name of ship.
CRUISE NO.	Cruise Number as assigned by Originator.
STAT./SAMPLE NO.	Station or Sample number as assigned by Originator.
COUNT.	NODC country code. This code (both numeric and alphanumeric) indicates the nationality of the originator.
INST.	Institution code. This code (both numeric and alphanumeric) reflects the agency or institution conducting the survey.
LATITUDE	
ACC.	Code for navigational accuracy.
DEG.	In degrees, minutes, and hundredths of minutes, N. or S.
MIN. 1/100	
LONGITUDE	
DEG.	In degrees, minutes, and hundredths of minutes, E. or W.
MIN. 1/100	
SND. DEV.	Code indicating device used for recording sounding depth.
DEPTH m.	Sounding depth in meters.
CORR.	Code indicates if sounding depth is corrected or uncorrected.
SAMPLE OBT.	Code for general nature of sample obtained.
ANAL.	Code indicating the nature of the sample analysis.
SAMP. MET.	Code for general type of sampling apparatus used.

EXPLANATION OF THE NODC LISTING FORMAT
(Continued)

ENTRY	DESCRIPTION OF FIELD
PHOTO	
BOT.	Code indicates if bottom photograph was taken during sampling.
SAMP.	Code indicates if a photograph of the sample was taken.
CARD TYPE	Card type I identifies the Master Identification Card.
CARD NO.	Number indicates print-out sequence within a station (NODC consecutive number).
DECK NO.	Deck 41 identifies the NODC Geological Sample Information Deck.

CARD TYPE II TEMPLATE

ENTRY	DESCRIPTION OF FIELD
DEV.	Code indicates type of primary sampler used to obtain sample and subsampler used if an additional sample was obtained.
COND.	Code describes condition of samples when brought back on board.
TOT. WT. Kg.	Total weight (including all added weights) of the coring device.
FREE FL. m.	Free Fall distance to the nearest meter.
PENET. m. 1/10	Ocean bottom penetration of the corer in meters to nearest tenth.
DIAM. cm. 1/10	Core diameter or inside diameter of corer to nearest tenth of a centimeter.
LENGTH cm.	Total length of core, including disturbed portion, to nearest centimeter.

EXPLANATION OF THE NODC LISTING FORMAT
(Continued)

ENTRY	DESCRIPTION OF FIELD
COND.	Code describes condition of core as initially obtained.
DIST. PORT. cm.	Length of disturbed portion of core in centimeters.
SEC.	Code describes core sectioning procedure.
EXT.	Indicates if the core is removed from the casing, barrel, or liner of coring device.
VOLUME $dm.^3$	Volume of grab or dredge sample in cubic decimeters.
PRESERVATION H_2O	Code indicates water preservation technique.
BAC.	Code indicates bacteria preservation technique.
STRUC.	Code indicates structure preservation technique.
SAMPLING REMARKS	Originator's additional comments concerning the sampling at this station.
CARD TYPE	Card type II identifies the Sampling Information Card.
CARD NO.	Number indicates print-out sequence within a station (NODC consecutive numbers).
DECK NO.	Deck 41 identifies NODC Geological Sample Information Deck.

CARD TYPE III TEMPLATE

ENTRY	DESCRIPTION OF FIELD
CORE INTERVAL	
TOP	Beginning of uppermost core segment in centimeters.
BOTTOM	Bottom of uppermost core segment in centimeters.

EXPLANATION OF THE NODC LISTING FORMAT
(Continued)

ENTRY	DESCRIPTION OF FIELD
MUNSELL COLOR	Munsell color code number for the color of the wet sample segment.
ODOR	Code indicates presence of odors.
SEDIMENT DESCRIPTION	Description of sediment (numeric and alphanumeric). This entry may be abbreviated.
CARD TYPE	Card type III identifies the Sample Description Card.
CARD NO.	Number indicates print-out sequence within a station (NODC consecutive number).
DECK NO.	Deck 41 identifies the NODC Geological Sample Information Deck.

APPENDIX 25

Magnetic Tape Layout for Geological Sample Information

IBM 7074 TAPE RECORD LAYOUT

NODC GEOLOGICAL DATA

MASTER IDENTIFICATION CARD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
REFERENCE NO					CONSEC. NO				MARSDEN SQ.			1° SQ.	DR	GMT YEAR		MO.		DAY		HOUR		SHIP			CRUISE NO.				STA. OR SAMPLE NO.							COUNTRY		INST.		ACCURACY	LATITUDE °		′		1/100	LONGITUDE °						

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
																									1			4	1
′1/100	SD	DEPTH m						COR	SAMPLE QBT		TOA	SM	PHOTO BOT	SAM											CARD TYPE	CARD NO.		DECK NO.	

133 G7

IBM 7074 TAPE RECORD LAYOUT

NODC GEOLOGICAL CARD

SAMPLING INFORMATION CARD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1–15 IDENTICAL TO MASTER CARD															SAMPLER DEVICE		CORD	TOTAL WGT			FREE FALL DISTANCE		PENETRATION		DIAMETER		LENGTH		CORE	SAMPLE DISTURBED PORTION		SEC	EXM	VOLUME		WATER BACTERIA													

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
																									2			4	1
REMARKS (SAMPLING)																									CARD TYPE	CARD NO.		DECK NO.	

134 98

IBM 7074 TAPE RECORD LAYOUT

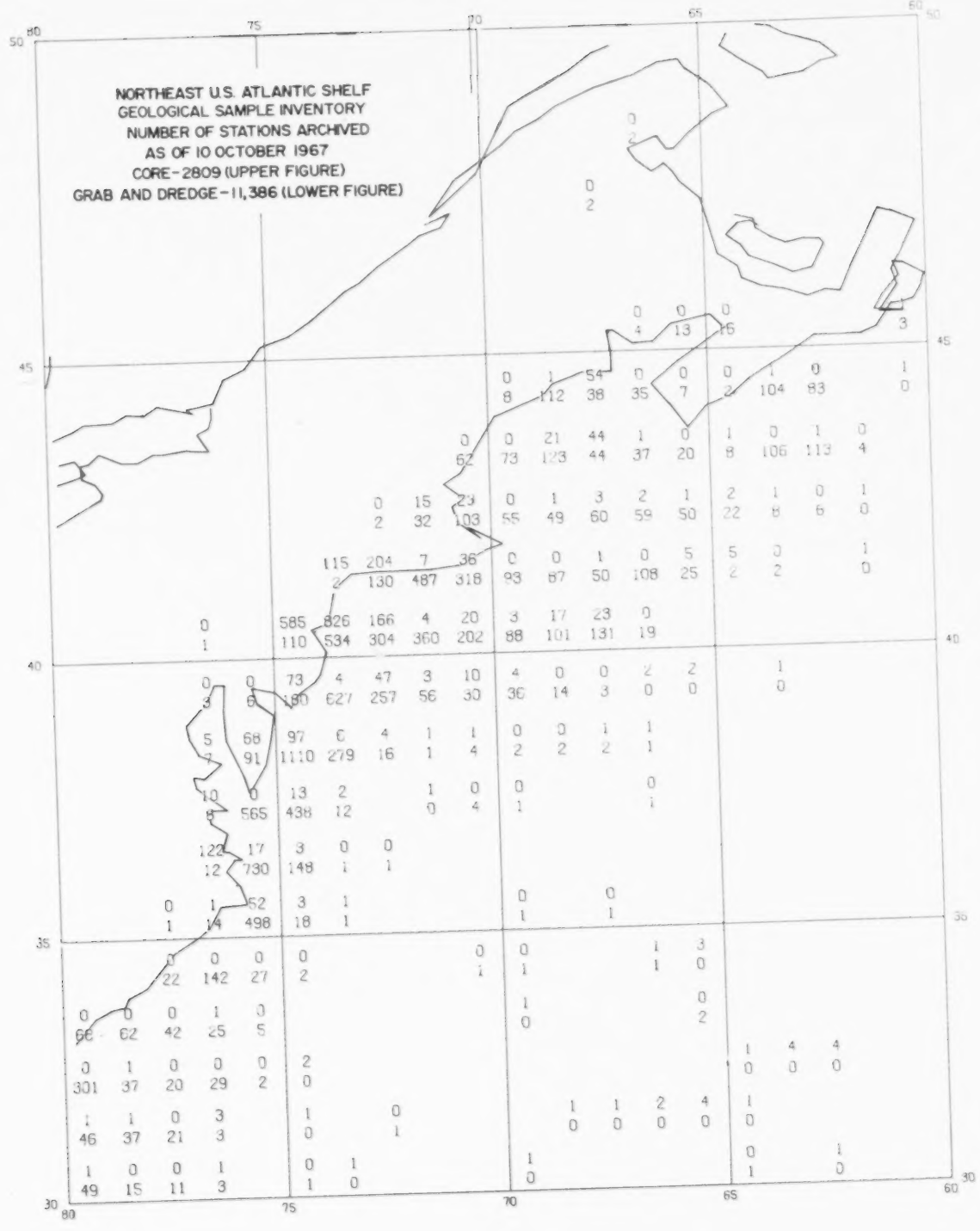
NODC GEOLOGICAL DATA

SAMPLE DESCRIPTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
COLUMNS 1–15 IDENTICAL TO MASTER CARD															CORE INTERVAL TOP (cm)							BOTTOM (cm)														

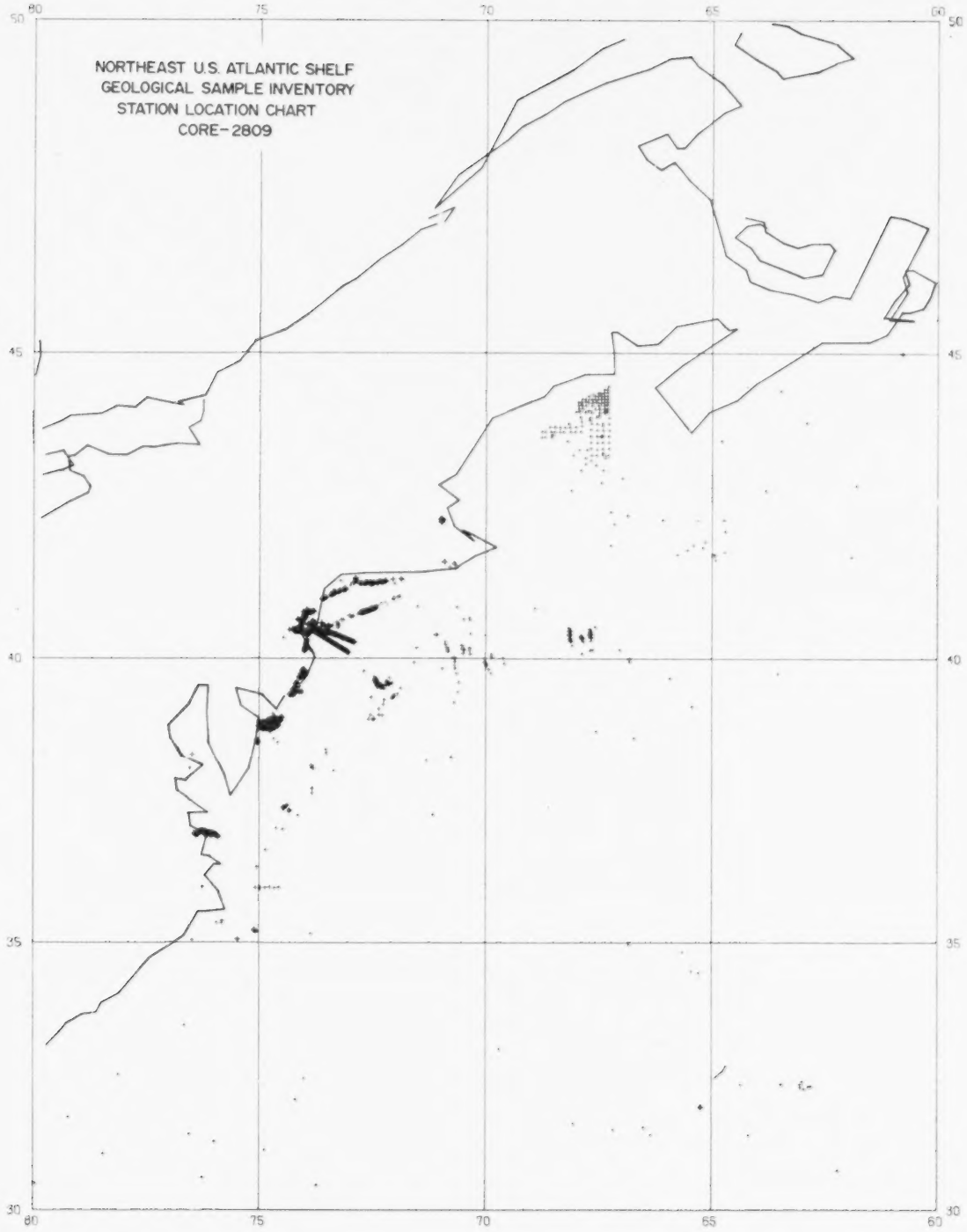
APPENDIX 26

Number of Geological Samples per 1° Square Plot


NORTHEAST U.S. ATLANTIC SHELF
GEOLOGICAL SAMPLE INVENTORY
NUMBER OF STATIONS ARCHIVED
AS OF 10 OCTOBER 1967
CORE - 2809 (UPPER FIGURE)
GRAB AND DREDGE - 11,386 (LOWER FIGURE)
80
75
70
65
60
50
45
40
35
30

APPENDIX 27

Point Location Plot of Geological Samples


NORTHEAST U.S. ATLANTIC SHELF
GEOLOGICAL SAMPLE INVENTORY
STATION LOCATION CHART
CORE-2809
80
75
70
65
60
50
45
40
35
30

APPENDIX 28

Printout Formats for Biological Data

Deck 25
ZOOPLANKTON DATA

REFERENCE		MARSDEN SQUARE			ENV		GMT DATE			TIME		LATITUDE			LONGITUDE			COUNTRY	INSTITUTION	ORIGINATOR'S			DEPTH TO BOTTOM	SAMPLING DEPTH		SAMPLING DEVICE	FLOWMETER TYPE	TYPE OF NET	MOUTH DIAMETER OF SAMPLER	CARD	DECK
IDENTITY NUMBER	CONSEC STATION NO	10	5	1	TYPE	SAMPLE DEPTH	MONTH	DAY	YEAR	LOCAL HOUR	LOCAL 1/10	GMT HOUR	GMT 1/10	DEGREES	MINUTES	N/S	DEGREES	MINUTES	E/W			CRUISE NUMBER	STATION NUMBER			UPPER DEPTH meters	LOWER DEPTH meters					TYPE	NUMBER
00002	013	031	4	68		7	4	03/15/64		22.1		18.1		0645		N	0580		E	74	06	0003	05267		03841	0465-1015		3/5	0	1	070	1	07 25

		NET			SAMPLING		VOLUME OF WATER FILTERED	WEIGHT OF SAMPLE g m		LOSS ON IGNITION mg	DISPLACEMENT VOLUME OF SAMPLE (ml/1000m)		AGE OF PLANKTON SAMPLE WHEN MEASURED					POPULATION DENSITY no. m		TOTAL NUMBER OF SPECIES	NO. OF SPECIES MAKING 80% OF SAMPLE								CARD	DECK
	METERING EFFICIENCY	MESH APERTURE mm	MATERIAL	TYPE AND MFGR	DURATION minutes	SHIP SPEED knots		WET	DRY																		TYPE	NUMBER
		.23	1		036		169.1				01.7																	2	08 25

																																							CARD	DECK
SPECIAL SAMPLE	SPECIAL ANALYSIS	SCYPHOZOA	CTENOPHORA	PLATYHELMINTHES	CHAETOGNATHA	GASTROPODA	PTEROPODA	HETEROPODA	HETEROPODA	EUPHAUSIACEA	POLYCHAETA	HEMIPTERA	CLADOCERA	OSTRACODA	COPEPODA	CALANOIDA	CYCLOPOIDA	HARPACTICOIDA	ISOPODA	EUPHAUSIACEA	MYSIDACEA	AMPHIPODA	HYPERIIDEA	CUMACEA	THALIACEA	SALPIDAE	DOLIOLIDAE	PHORONIDEA	ASCIDIACEA	LARVACEA	ANTHOZOA LARVAE	ECHINODERM LARVAE	CTENOPHORE LARVAE	CHAETOGNATH LARVAE	DECAPODA LARVAE	STOMATOPODA LARVAE	DECAPODA LARVAE	DECAPODA LARVAE	DECA

Deck 22
PHYTOPLANKTON DATA

REFERENCE		MARSDEN SQUARE			ENV		TIME OF DAY	GMT DATE			TIME			LATITUDE			LONGITUDE			COUNTRY	INSTITUTION	ORIGINATOR'S		MANUAL SAMPLING SYSTEM	DEPTH TO BOTTOM	SAMPLING DEPTH		SAMPLING DEVICE	NET		CARD	DECK
IDENTITY NUMBER	CONSECUTIVE STATION P.O.	10	5	1	TYPE	DEPTH RANGE		MONTH	DAY	YEAR	LOCAL HOUR	LOCAL 1/10	GMT HOUR	GMT 1/10	DEGREES	MINUTES	N/S	DEGREES	MINUTES	E/W			CRUISE NUMBER	STATION NUMBER			UPPER DEPTH	LOWER DEPTH		MOUTH DIAMETER	LENGTH	TYPE	NUMBER
00003	008	433	1	11			6	07	14	60					31	29	S	101	10	E	09	03	0260	00127					9			1	01	22

NET MESH APERTURE	DURATION	SAMPLING SPEED	VOLUME OF WATER FILTERED	PRESERVATIVE	PHYTOMETRIC STATUS	COUNTING TECHNIQUE	CELL VOLUME	NUMBER OF CELLS (1000's)	TOTAL NUMBER OF SPECIES	NUMBER OF SPECIES CONSTITUTING 90% OF SAMPLE	CHLORO PHYCEAE	DINO PHYCEAE	BACILLARIO PHYCEAE	CYANO PHYCEAE	SILICO FLAGELLATES	NON SILICO FLAGELLATES	OTHER	SOSC ACCESSION NUMBER	CARD TYPE	CARD NUMBER	DECK NUMBER
.13	20			1	3				002			1	1						2	02	22

00003	009	433	1	10			7	07	14	60					31	19	S	100	17	E	09	03	0260	00128					9			1	01	22
		.13	20					1	3						003						1	1										2	02	22
00003	010	434	2	19			5	07	14	60					31	12	S	099	15	E	09	03	0260	00129					9			1	01	22
		.13	20					1	3						026						1	1										2	02	22
00003	011	434	2	08			5	07	14	60					30	59	S	098	41	E	09	03	0260	00130					9			1	01	22
		.13	20					1	3						003						3	1										2	02	22
00003	012	434	2	07			7	07	15	60					30	40	S	097	30	E	09	03	0260	00131	03072				9			1	01	22
		.13	20					1	3						009						1	1										2	02	22
00003	013	434	2	07			6	07	15	60					30	37	S	097	18	E	09	03	0260	00132					9			1	01	22
		.13	20					1	3						003						1	1										2	02	22
00003	014	398	3	94			7	6	07	16	60				29	40	S	094	47	E	09	03	0260	00133	03072				9			1	01	22
		.13	20					1	3						083						1	1										2	02	22

906

Deck 24
PHYTOPLANKTON PIGMENT DATA

REFERENCE		MARSDEN SQUARE			ENV		PERIOD OF DAY	GMT DATE			SAMPLING TIME		LATITUDE		LONGITUDE		COUNTRY	INSTITUTION	ORIGINATOR'S		VOLUME OF WATER FILTERED	FILTER TYPE	PORE SIZE OF FILTER	SOLVENT					SPECTROPHOTOMETER				CARD	DECK
IDENTITY NUMBER	CONSEC STATION NO	10°	1°	1°	TYPE	DEPTH RANGE		MONTH	DAY	YEAR	LOCAL TIME HOUR	GMT HOUR	DEGREES	MINUTES N/S	DEGREES	MINUTES E/W			CRUISE NUMBER	STATION NUMBER				TYPE	CONCN FRACTION %	DETERMINED IN LABORATORY	PRECISION CORRECTED	PRE-ASSAY TREATMENT	SHAKE AND WATER	CALIBRATION MO	CALIBRATION YEAR	BLANK USED	NUMBER	NUMBER
00019	001	027	3	83			2	11	23	63	11	05	08	04N	093	57E	49	44	0002	00001	7000	2	.45	1	90			1				1	01	24

DEPTH OF WATER SAMPLE meters	OPTICAL DENSITIES (O.D.) OF PIGMENTS DETERMINED AT VARIOUS WAVE LENGTHS (O.D. CORRECTED FOR THE BLANK)																LENGTH OF LIGHT PATH cm	FINAL VOLUME OF SOLVENT ml	CARD	DECK
	480 mμ		510 mμ		630 mμ		645 mμ		663 mμ		750 mμ									
	O.D.	HALF BAND WIDTH mμ FROM TO	O.D.	HALF BAND WIDTH mμ FROM TO	O.D.	HALF BAND WIDTH mμ FROM TO	O.D.	HALF BAND WIDTH mμ FROM TO	O.D.	HALF BAND WIDTH mμ FROM TO	O.D.	HALF BAND WIDTH mμ FROM TO							TYPE	NUMBER
000	088		059		025		022		023		007						05	11	2	02 24
010	119		074		038		036		039		015						05	11	2	03 24
025	235		128		078		072		082		023						05	12	2	04 24
050	343		152		085		084		115		022						05	11	2	05 24
075	225		112		066		063		082		025						05	10	2	06 24
100	149		081		047		045		052		018						05	10	2	07 24
125	105		072		039		035		038		018						05	10	2	08 24

SAMPLE DEPTH meters	CHLOROPHYLL a			CHLOROPHYLL b			CHLOROPHYLL c				CAROTENOIDS						CARD	DECK
	mg m⁻³	mg m⁻³	SPECIFIC ABSORPTION COEFFICIENT	mg m⁻³	mg m⁻³	SPECIFIC ABSORPTION COEFFICIENT	mg m⁻³	mg m⁻³	RATIO	SPECIFIC ABSORPTION COEFFICIENT	ASTACIN mg m⁻³	NON ASTACIN mg m⁻³	RATIO	SPECIFIC ABSORPTION COEFFICIENT ASTACIN	SPECIFIC ABSORPTION COEFFICIENT NON ASTACIN		TYPE	NUMBER
000	00.06			•			•										3	11 24
010	00.07			•			•										3	12 24
025	00.23			•			•										3	13 24
050	00.37			•			•										3	14 24
075	00.12			•			•										3	15 24
100	00.12			•			•										3	16 24
125	00.07			•			•										3	17 24
150	00.07			•			•										3	18 24
200	00.04			•			•										3	19 24

207

Deck 23
PRIMARY PRODUCTIVITY DATA

REFERENCE		MARSDEN SQUARE				GMT DATE			LATITUDE		LONGITUDE			COUNTRY	INSTITUTION	ORIGINATOR'S		TOTAL CO_2 CONCENTRATION OF WATER SAMPLE (ml/l)	ACTIVITY OF CARBON 14 AMPLE (μc)	COLLECTION TIME OF WATER SAMPLE	INITIAL INCUBATION TIME	DURATION OF INCUBATION		ILLUMINATION TYPE	WATER TYPE	COMPLIANT VALUE (LENGTH OR TRANSMISSION OF FILTER) (cm)	MEAN DAILY GMT INTENSITY		FLUX CONVERSION	CARD TYPE	CARD NUMBER	DECK NUMBER
IDENTIFY NUMBER	CONSEC STATION NO.	0	3		TYPE	MONTH	DAY	YEAR	DEGREES	MINUTES N/S	DEGREES	MINUTES	E/W			CRUISE NUMBER	STATION NUMBER					HOURS	TENTHS									
00005	008	432	3	74		02	12	60	36	35	121	58	E	09	03	0160	00032	C		04.1	1030		04.0	4					1	01	23

DATA VARIATION		MEAN LIGHT INTENSITY DURING INCUBATION (ft)	GMT TRANSMISSION DATA: WAVE LENGTH MEASURED (mμ)	GMT TRANSMISSION DATA: RADIANCE METER HALF BAND WIDTH (mμ)	GMT TRANSMISSION DATA: RELATIVE SENSITIVITY (%)	GMT TRANSMISSION DATA: RECEIVER (%)	GMT TRANSMISSION DATA: SUN (%)	GMT TRANSMISSION DATA: TYPE RADIANCE	ATTENUATION COEFFICIENT	PHOTOMETRIC DEPTH (meters) TRANSMISSION: 100%	75%	50%	25%	10%	1%	SAMPLING DEPTHS (meters): DEPTH 1	DEPTH 2	DEPTH 3	DEPTH 4	DEPTH 5	DEPTH 6	CARD TYPE	CARD NUMBER	DECK NUMBER
		1100														00	25	50	75	100	150	2	02	23

CARBON 14 ASSIMILATION: mg C/m³/hr	mg C/m³/day	mg C/m³/day INTEGRATED	INCUBATION DURATION	MEAN WATER TEMPERATURE DURING INCUBATION	RAW DATA: LIGHT BOTTLE ACTIVITY TOTAL COUNT	MINUTES COUNTED	DARK BOTTLE ACTIVITY TOTAL COUNT	MINUTES COUNTED	BACKGROUND ACTIVITY COUNTS/MIN	CARD TYPE	CARD NUMBER	DECK NUMBER
000	00.07	000.00	6		000124	PM	000023	PM	0015		30123	
025	00.03	000.01	6		000122	PM	000084	PM	0015		30423	
050	00.07	000.03	6		000102	PM	000005	PM	0015		30523	
075	00.23	000.07	6		000350	PM	000004	PM	0015		30623	
100	00.03	000.11	6		000141	PM	000017	PM	0015		30723	
150	00.00	000.12	6		000036	PM	000077	PM	0015		30823	

00005 009 433 4 73 B 02/12/60 3700S 10858E 09 03 0160 00035 C 04.1 1030 04.0 4 10123

01100 00 25 50 75 100 150 20223

000	00.02	000.00	6		000043	PM	000015	PM	0015		30223	
025	00.05	000.01	6		000088	PM	000012	PM	0015		30423	
050	00.04	000.02	6		000075	PM	000016	PM	0015		30523	
075	00.05	000.03	6		000093	PM	000022	PM	0015		30623	
100	00.11	000.05	6		000176	PM	000011	PM	0015		30723	
150	00.14	000.11	6		000219	PM	000010	PM	0015		30823	

00005 010 433 3 74 B 02/12/60 3700S 10452E 09 03 0160 00039 C 04.1 1000 04.0 4 10123

01100 00 25 50 75 100 150 20223

000	00.05	000.00	6		000267	PM	000192	PM	0015		30323	

150 108

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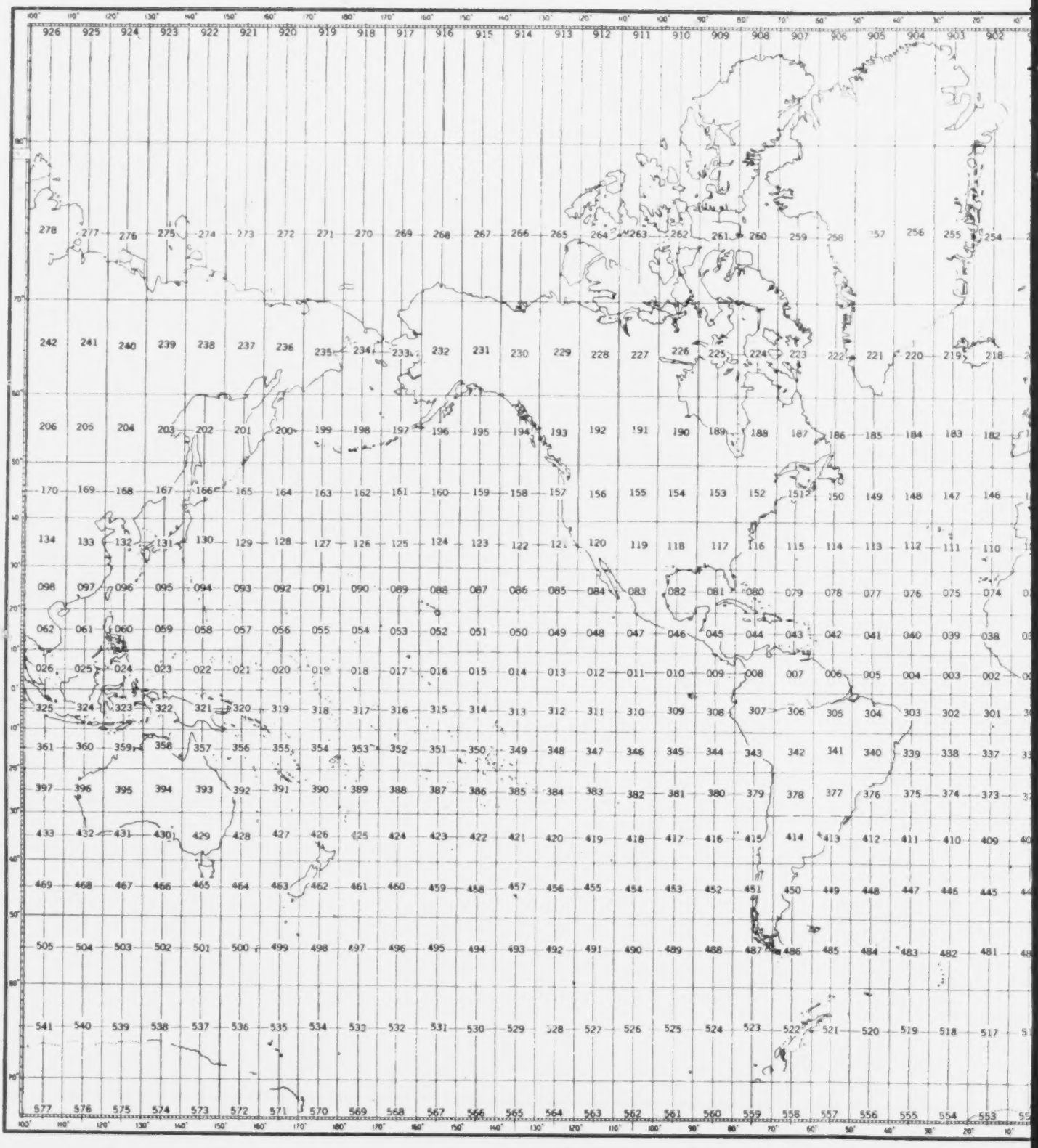
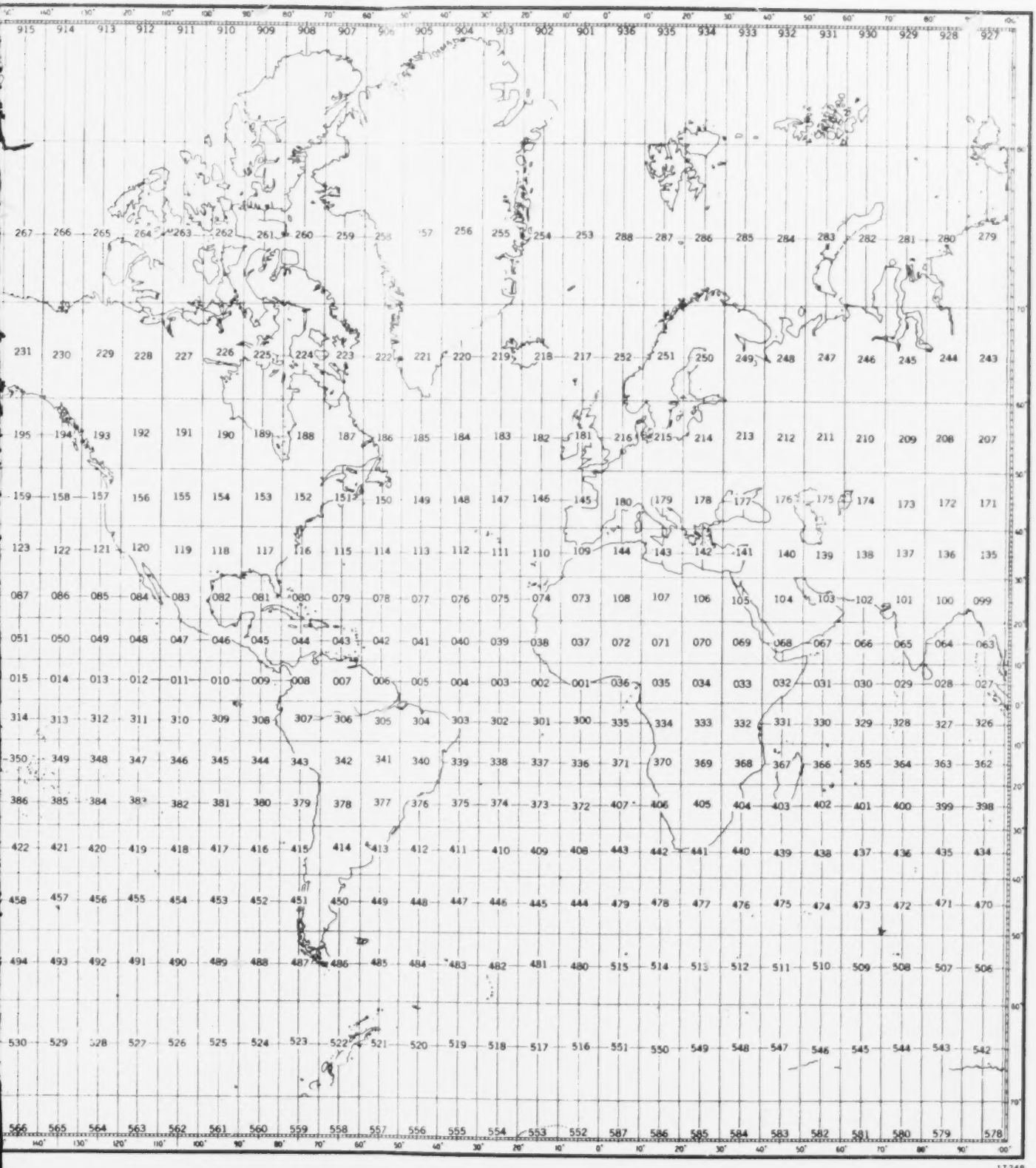


MARSDEN SQUARE CHART



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MARSDEN SQUARE CHART

National Oceanographic Data Center

User's Guide for NODC's Data Processing Systems. Compiled by Sonja Schuyler. Publication G-15 in the NODC General Series. 1969.

This publication contains descriptions of the data processing systems of the Data Center with examples of the products from these systems.

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